THE IRON TRADE REVIEW

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Business Progresses While Politics Sizzles

Mills Find it Difficult to Satisfy Demand for Deliveries—
Steel Corporation Buys Crude Steel—Interesting Coke Situation

During the fiercest ante convention presidential campaign ever held in this country, the trade has found it difficult to convince itself that business was really disregarding political clamor, but every week adds new evidence to prove that substantial progress toward great prosperity is being made. After prices on nearly everything, from iron ore to the most highly finished product, had been reduced to or below cost, contracts on a tremendous scale were made and every day is now showing by liberal specifications that greater contracts than were justified were not made. Owing, however, to these low price contracts, business is not being done on a very profitable basis, but quotations are being gradually pushed up and as sales are made at advancing prices, reasonable profits will be enjoyed. The usual accompaniments of prosperous times, such as shortage of labor and difficulty in meeting delivery demands, are increasingly important factors of the present situation.

Pig Iron

Purchases have been largely by cast iron pipe concerns. Delaware river pipe works purchased 4,500 tons, and a Virginia pipe maker has taken 6,000 tons of forge and No. 3, for third quarter delivery, from a leading Virginia maker at $12.25 and $12.50, respectively. The purchase of considerable southern iron by the leading cast iron pipe interest is reported. In basic, a central Pennsylvania consumer has closed for 5,000 tons for third quarter at $15.25, delivered, and another buyer has taken 2,000 tons at $15.50, delivered. In the Pittsburgh territory, $13.25, valley, is the usual quotation, and inquiry for a considerable tonnage is pending. There is some weakness in southern Ohio pig iron, especially at Ironton.

Crude Steel

The inability of the Steel Corporation, particularly at its Carnegie and American Steel & Wire Co. plants, to make enough billets to meet its requirements has resulted in further purchases. The Corporation is now getting crude steel from eastern Pennsylvania, Cleveland and Youngstown, and its purchases during the recent movement have amounted to about 35,000 tons. There is a decided shortage of crude steel in the Chicago district and buyers from that territory have been sending out inquiries to steel plants in the central west for large tonnages of billets.

Coke

A contract for 12,000 tons per month of furnace coke for last half delivery, closed at Pittsburgh on the basis of $2.50, ovens, shows pretty conclusively that coke producers are succeeding in establishing their prices in spite of long continued efforts of furnaces to contract at $2.25 for last half requirements. Owing, however, to the fact that an embargo has been placed against coke for Canadian furnaces, and that two large stacks in the middle west have gone out for repairs, the market for spot coke has softened somewhat. On an inquiry for a large tonnage of foundry coke for last half, $3 has been quoted, but a contract has not been made.

Boiler Tubes

Nominal quotations on boiler tubes have been advanced $1 per ton by the leading interest, but as regular quotations have not been regarded for many months, the actual price at which new business will be transacted has not yet been determined. Nearly all contracts on books for delivery up to July 1, were made at prices about $5 below the nominal official quotations. There is, however, improvement in demand and probably better prices will be obtained at an early date. Makers are asking for from three to four weeks on deliveries.

Sheets

The demand for the delivery of sheets is active and mills are having difficulty in satisfying customers. It is true, however, that some mills which did not make contracts up to their full capacity when a large volume of contracting was being done at low prices some time ago, are now willing to take business at a concession of a dollar below the current quotations. Scarcity of sheet bars has caused some anxiety.

PITTSBURGH

Mills Unable to Meet Delivery Demands

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., May 21.

Mills have fallen further behind on deliveries and have been unable to meet the demands for shipments. Steel boiler tubes have advanced $2 a ton. Tin plate has advanced 10 cents a box. Steel plates have secured premiums of $1 a ton for prompt shipment. Inquiries as well as new business show the upward tendency of these lines. Semi-finished steel is growing scarcer. The pig iron market, while quiet, is very firm, and production is continuing on the high rate of the past several weeks.

Pig Iron.—The pig iron market for the past week has been quiet but firm, the point of interest being centered about basic iron, which has been moving slowly, but such sales as are going are reported as showing better than the nominal market of $13. Sales of 1,000 tons for last half were closed at $13.25, and some very small lots for third quarter at $13.50. The presence of important inquiries in tonnages ranging from 12,000 to 20,000 tons, has created more or less excitement and some bidding, but there is apparently no large tonnage disposed to come out at these prices that will carry over the entire last half of the year. One important buyer in the Pittsburgh territory is reported to have secured between 20,000 and 25,000 tons of basic which will meet its requirements to July 1. Another fair sized consumer is asking prices on last half delivery for 12,000 tons, which is likely to be considerably increased. Bessemer iron is quiet. The Carnegie Steel Co. formally confirmed this week the purchase of 15,000 tons of basic iron for prompt shipment at $14.50, valley, this being the transaction referred to some time ago. Foundry iron is well sold up, and the few furnaces that are now running on foundry iron are quoting $13.25 for both prompt and forward delivery. Sales in the Pittsburgh territory are not large. Gray forge is well sold ahead for the first half and is very firm at $13 to $13.25 for prompt shipments, negotiations for the third quarter and last half indicating a slightly better price being possible for the makers. The firm tone of southern iron is acting as a stimulant to the prices on all northern grades with exception of basic, which, in spite of the large consumption, appears to be sluggish, and until some definite movement is begun but little change is looked for. We quote the market as follows:

(Prompt Shipment.)

Bessemer, valley	$14.25
Bessemer, Pittsburgh	15.15
Basic, valley	13.00
Basic, Pittsburgh	13.90
No. 2 foundry, Pittsburgh	14.15
Gray forge, Pittsburgh	13.90
Malleable, Pittsburgh	14.15

(Third Quarter.)

Bessemer, valley	$14.25
Bessemer, Pittsburgh	15.15
Basic, Pittsburgh	14.15
No. 2 foundry, Pittsburgh	14.40
Gray forge, Pittsburgh	14.00
Malleable, Pittsburgh	14.15

Ferro-Alloys. — Ferro-alloys are in good demand. Ferro-manganese is scarce and prompt shipment prices have advanced to $58 and $60, Baltimore. Some of the larger dealers are withdrawing quotations on forward deliveries, and while others are quoting nominally at $48.50 for last half, a number of contracts are still unsatisfied for the first half delivery, and consumers are forced into the open market to cover for their immediate requirements. Ferro-silicon, 50 per cent grade, is quiet but firm at $70 to $71. Domestic grades are selling more freely, and at very firm prices with some talk of an advance in the near future.

We quote ferro-manganese at $48.50, Baltimore, and $58 to $60 for prompt delivery. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted nominally at $70, Pittsburgh, for prompt and forward delivery; 12 per cent, $22; 11 per cent, $21; 10 per cent, $20, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates. — Specifications against existing contracts for plates are keeping all mills operating to capacity. New business has been taken in fairly large tonnages on the advanced price of 1.25c, and during the past week between 7,000 and 10,000 tons were placed at the new price for prompt shipment, while other inquiries show that the market has supported the new base quite easily. Car buying has temporarily quieted, and not much new inquiry has appeared of any importance. There has been a better attitude of the ship building industry towards material, a contract for two ocean-going vessels, to be built on the lakes, having been closed last week, requiring 3,000 tons of plates and shapes. There is some new vessel tonnage also on the way for the Atlantic coast, but the bulk of this tonnage that has been pending for some time is held up awaiting a decision by congress as to the Panama canal toll rates, and until this problem is settled, the extensive tonnage upon which inquiries have been made will likely be undetermined. A sale of a small tonnage of prompt plates was reported the past week at 1.30c, an advance of $1 above the market, which was offered as a premium. There is considerable talk of an advance in the market to this higher price. Shapes are in equal demand, and prices are very firm. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.25c. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c Gages under ½ inch to and including ⅜-inch plate on thin edge, 0.10c; under ⅜ and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—The manufacturers of steel sheets are further in arrears with deliveries than a week ago, particularly with galvanized sheets, which are very scarce. Buyers are urgent in specifying for deliveries, and there is some new business coming out in the form of supplemental orders to existing contracts. One of the leading independent mills is running six weeks behind on black sheet deliveries and eight weeks on galvanized. Scarcity of sheet bars is causing concern for independents as well as for the leading interest, and is checking a full capacity on operations. We quote the market as follows:

Flat Sheets

Black Sheets.—Nos. 10-12, $1.60 per 100 pounds; Nos. 13-14, $1.65; Nos. 15-16, $1.70; Nos. 17-21, $1.75; Nos. 22-24, $1.70 to $1.80;

Nos. 25-26, $1.75 to $1.85; No. 27, $1.90; No. 28, $1.95; No. 29, $2.00; No. 30, $2.10.

Blue Annealed.—Nos. 3-8, $1.35 per 100 pounds; Nos. 9-10, $1.40; Nos. 11-12, $1.45; Nos. 13-14, $1.50; Nos. 15-16, $1.60.

Galvanized.—Nos. 10-11, $2.00 per 100 pounds; Nos. 12-14, $2.10; Nos. 15-16, $2.25; Nos. 17-21, $2.40; Nos. 22-24, $2.50; Nos. 25-26, $2.70; No. 27, $2.85; No. 28, $3.00; No. 29, $3.10; No. 30, $3.30.

Roofing Sheets

Galvanized

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c, 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with cleats, 15c.

Painted Roofing

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate.—Specifications are coming in stronger for tin plate, and new business, while relatively small, is being taken at full market prices. The leading interest has advanced the price on coke tin to $3.50 per base box, and while unable to quote on business for a long way ahead, is maintaining the advanced price firmly. Most of the larger independents are so well supplied with tonnage that they are not anxious to take on additional business excepting at the higher prices, but it is believed that buyers can place orders easily at $3.40 for the last half delivery. Terne plate is very active and firm. We quote the market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.40 to $3.50, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—Considerable new tonnage in open-hearth rails for both export and domestic shipment has been booked during the past week, and the leading interest has been forced to change its Ohio plant for sheet bars to rail production, to take care of the rapidly increasing specifications, thus reducing its sheet bar tonnage. The same interest has some spare capacity for Bessemer rails, but this is being gradually absorbed. The light rail demand has shown a marked improvement, the temporary lull due to labor disturbances in the coal fields having been broken, and buyers are now in the market for normal requirements that are expected to take the full capacity of the mills for some months ahead. Inquiries for rails of standard section grades are appearing from buyers within the territory supplied by the Pittsburgh producers, and the last half promises to be extremely heavy. There has also been a heavy increase in the demand for track material with the advance noted in railroad spikes of 1.40c to 1.45c. Splice bars are also stronger, and specifications are very much heavier than a week ago. Rail mills are thus far equal in tonnage production to April, and indications point to a higher record for May, and may go ahead of their highest point in the past. The market is quoted as follows, with the base price 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.15c, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.23c to 2.25c, Pittsburgh.

Railroad Spikes

4½, 5 and 5½ and 9-16	$1.45
3, 3½, 4, 4½ and 5 x ½	.10
3½ 4 and 4½ x 7/16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x ⅜	.60
2 x 5-16	.80

Steel.—Specifications are continuing to increase for semi-finished steel, and makers are reporting a maximum specifying by practically all buyers, which has taxed the capacity of every plant for both Bessemer and open hearth billets and sheet bars. A good many buyers who had failed to cover for their requirements to the maximum of their contracts are now forced into the open market, and are cleaning up all the spare tonnage. Prices, as a result, have steadily grown stronger. Some round lots of sheet bars for Pittsburgh delivery were placed with some difficulty at $22, Pittsburgh, the makers being in the Youngstown district. The leading interest has been a steady buyer to fill in its own shortages in both billets and sheet bars, and it is estimated that between 30,000 and 35,000 tons have been taken up in this way during the past ten days. Inquiries for the third quarter indicate another advance in prices of $1 a ton, the range being from $22 to $23, Youngstown and Pittsburgh delivery. Some of the smaller producers who have been frequent sellers of billets and sheet bars have turned active buyers and are looking ahead for the third quarter tonnage, while the leading interest is entirely out of the market for the next quarter, and has not yet quoted on any fourth quarter tonnage that has come up for discussion. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $21.00 to $21.50, with the usual extra for size and analysis, and open-hearth rolling billets, $21.00 to $21.50. Bessemer sheet and tin bars are quoted at $21.50 to $22.50, and open-hearth sheet bars are quoted at $21.50 to $22.50, f. o. b. Pittsburgh, for second quarter, with full freight to destination added. Forging billets are quoted at $28, Pittsburgh.

Hoops and Bands.—Specifications continue very satisfactory against contracts for hoops and bands. New business is light and mills are booked so far ahead that there is no disposition to shade the present market, which is very firm at 1.25c to 1.30c for steel hoops, and bands are still firm. We quote the market as follows:

Hoops in carload lots, 1.25c to 1.30c, Pittsburgh; in less than carload lots, 1.40c; bands 1.20c, base, with net extras, as per standard steel.

Merchant Bars.—Specifications on merchant bars are extremely heavy, and the mills are operating to capacity. The larger bar mills are behind on deliveries, and prices are being held much more firmly at 1.20c, while considerable new business is being booked at this price. The market for steel shafting is very firm. There is perhaps a little less activity in specifying against contracts and new inquiries are not large, but manufacturers are operating full 80 per cent of capacity, and are disposed to hold firmly to the present discount list and not sacrifice for new tonnage. There is a slight improvement in the iron bar market, and shipments are increasing in volume. Prices are firm at 1.30c to 1.35c. We quote the market as follows:

Common iron bars, 1.30c to 1.35c, Pittsburgh; Bessemer and open-hearth steel bars, 1.20c; plow and cultivator, 1.25c; channels, angles, zees, tees, under 3 inch, 1.25c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35 advance. Cold rolled and ground shafting, 65 per cent off in carloads and 60 and 10 per cent in less than carloads, delivered in base territory.

Muck Bar.—Some inquiries are in the market for muck bar, and prices are firm while the consumption is increasing and surplus stocks are disappearing with increased rapidity on every hand. The advance of $1 a ton is being maintained firmly, and the last half of the year is likely to see a considerable shortage. We quote $29 to $30, Pittsburgh.

Structural.—There is a better inquiry for structural material, and fabricators are reporting much more active operations, and are estimating on more new business than a week ago. Railroad bridge construction is one of the principal factors, and there is a large volume of small tonnage that in the aggregae is quite important. The Farris Bridge Co., of Pittsburgh, has taken the general contract for the construction of a traction company viaduct at Grafton, W. Va., calling for 100 tons, and also a contract for the same interest for a bridge over the Tygart Valley river, calling for 500 tons, and a number of small highway bridges are being estimated upon this week. Bids are also being received for a new bridge at Altoona, Pa., of considerable importance as to tonnage. Structural material is very firm, but fabricators

are complaining of low prices on erection work. We quote the market as follows:

Beams and channels, 15 inches and under, zees, 1.25c; tees, 1.25c; angles, from 3 to 6 inches, 1.25c; over 6 inches, 1.35c; universal and sheared, 1.30c; over 15 inches, 1.35c; plates, 6¼ inches wide and wider, 1.35c.

Merchant Pipe.—Most of the iron pipe manufacturers are considerably behind on deliveries and are meeting difficulties in securing skelp fast enough for the finishing mills. Steel pipe is very firm and specifications are heavy. Mills are operating more nearly to capacity than at any time this year. The demand for line pipe is also important. In addition to a good run of small orders, which in the aggregate represent a very comfortable tonnage, there is an inquiry out calling for approximately 65 miles of steel line pipe of from 8-inch to 16-inch diameter, which is expected to be placed within a short time.

We quote the official discount to jobbers subject to the usual preferential discount to the larger buyer as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅛, ¼ inch.....	74	54	68	48
⅜ inch	75	65	69	53
½ inch	78	68	72	59
¾ to 1½ inch.....	81	73	75	64
2 to 3 inches.....	82	75	76	65
	Lap weld.			
2 inches	79	72	72	63
2½ to 4 inches.....	81	74	74	66
4½ to 6 inches.....	80	72	73	65
7 to 12 inches.....	77	68	71	61
13 to 15 inches.....	55	..	47	..
Extra Strong, Plain Ends.				
	Butt weld.			
⅜, ¼, ⅛ inch.....	70	60	65	55
½ inch	75	69	70	63
¾ to 1½ inch.....	79	73	74	65
2 to 3 inches.....	80	74	75	66
Extra Strong, Plain Ends.				
	Lap weld.			
2 inches	76	70	71	63
2½ to 4 inches.....	81	74	74	66
4½ to 6 inches.....	77	71	72	65
7 to 8 inches.....	70	60	65	55
9 to 12 inches.....	65	55	60	50
Double Extra Strong, Plain Ends.				
	Butt weld.			
½ inch	65	59	60	52
¾ to 1½ inch.....	68	62	63	55
2 to 3 inches.....	70	64	65	57
Double Extra Strong, Plain Ends.				
	Lap weld.			
2 inches	66	60	61	52
2½ to 4 inches.....	68	62	63	57
4½ to 6 inches.....	67	61	62	56
7 to 8 inches.....	60	50	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—Specifications are very heavy on boiler tubes, and new business has considerably improved. Mills are generally behind on deliveries. The leading interest announced an advance of $2 a ton, or a reduction of 1 point in the discount rate effective at once. New inquiry is appearing in the market and as a rule makers are asking from three to four weeks for deliveries. New business appearing in the market may be quoted on the higher rate, but as this has not been determined and as nearly all the orders on the books are at about $5 per ton below the nominal official discounts we have not changed those nominal quotations, which are as follows:

Steel

1¾ to 2¼ inch.....	65
2½ inch	67½
2¾ to 3¼ inch.....	72
3½ to 4½ inch.....	75
5 and 6 inch.....	67½
7 to 13 inch	65

Charcoal Iron

1½ inch	48
1¾ to 2¼ inch.....	50
2½ inch	55
2¾ to 5 inch.....	60

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Products.—Better specifications are running for wire products. Wire nails are being held firmly at $1.60 on new business, but the larger portion of operations is now going on the $1.55 base for which contracts run through the first half to a large extent. Shipments are much better, and some of the larger mills are behind on deliveries. Plain wire is also very active in demand, and specifying is along the same line with every evidence that the consumption is fully equal to the production at this time. We quote the market as follows:

Wire nails, jobbers, carload lots, $1.60; retailers' carload lots, $1.60 to $1.65; cut nails (western makers), jobbers' carload lots, $1.55 to $1.60, painted barb wire, jobbers' carload lots, $1.60; retailers' carload lots, $1.65 with 30c for galvanizing; plain wire to jobbers in carloads, $1.40; and to dealers, in carloads, $1.45; polished staples, $1.60; galvanized staples, $1.90.

Wire Rods.—Specifications are very satisfactory for wire rods, and the demand is slightly improved. New business is coming out at the higher prices now ruling. We quote $26 to $26.50 for Bessemer and open-hearth wire rods.

Coke.—A contract of 12,000 tons per month of furnace coke for last half delivery was closed this week on a basis of $2.50, ovens. This contract reaches the nominal price of contract coke demanded by coke operators for the first time and in large tonnages. Several small contracts and one or two renewals of old contracts have been made for last half at from $2.35 to $3.45, ovens, but under conditions that made the shading of the nominal price of less importance. Negotiations are under way for some very large last half contracts, both for furnaces in the east and middle west, and it is expected that these will be brought to a head every few days now on to July 1. The market for spot coke has softened some, this being due to two causes, the first that an embargo has been placed against coke for Canadian furnaces, and the second, two large furnaces operating in the middle west have gone out for repairs and have temporarily released their shipping requirements. One sale this week of 100 cars was closed at $2.25 with prompt shipment instructions that will confine the deliveries into the next two or three weeks. Several other sales have been closed at $2.35, the last of about 10 cars at the high figure. The efforts of the operators to increase production in the Connellsville region have practically been without result, the gain from week to week under the best conditions of operation being of small importance. This, with the fact that other furnaces are due to come in within a week or ten days will make spot coke firm up considerably. The Connellsville *Courier* reports for the week ending May 11 a total of 31,340 ovens active with a production of 401,960 tons, as compared with 32,663 ovens active and a total production of 401,544 tons for the preceding week. Foundry coke is quiet, but firm, the car supply being somewhat better and shipments more satisfactory. We quote standard Connellsville furnace coke for prompt shipment at $2.25 to $2.35 and for contract $2.45 to $2.50. For standard Connellsville foundry coke we quote for prompt shipment $2.60 to $2.75, and on contract $2.75 to $3.00.

Old Material.—Owing to large consumers entering the market for heavy melting steel, and going over the dealers' heads to some extent, prices have been forced slightly higher and will likely show a net gain of 10 to 15 cents a ton when the same consumers place tonnages with the dealers again. Between 15,000 and 20,000 tons of heavy melting steel closed within the last two weeks have been under these conditions Dealers are paying $13.50 for heavy melting steel because they are unable to buy it for less, and while filling contracts at the same prices, will accept no new business at that figure. There is a general scarcity of heavy melting steel, and inquiries are not falling off, but buying is somewhat slower for the past few days. Other lines of old material have advanced sharply. One of the most important advances is in old car wheels, which have been sold in good sized lots for $14.25 and $14.50, as compared with $12.50 and $13.00 within the recent past. No. 1 wrought

scrap has also grown higher and more scarce, the advance in price being $1 a ton or from $13.50 to $14.00. Bundled sheet scrap, which has become quite active as well as very scarce, has advanced from 50 to 75 cents, and rerolling rails have gone up from 25 to 50 cents a ton. No. 1 cast scrap is slightly weaker, a decline of 25 cents was noted in the last quotation. The demand for old car wheels has been sharply affected by the eastern market, where there is a scarcity, and an extensive inquiry for them. The scrap market is probably more nearly sold up at this time than for several months. The buying is on a larger scale, and unless new supplies are more prolific, prices are certain to advance again. We quote gross tons, delivered in the Pittsburgh district, including Monessen, Brackenridge, Steubenville and Follansbee, as follows:

Heavy melting scrap	$13.25 to 13.50
Rerolling rails	13.75 to 14.50
Malleable	12.00 to 12.50
Bundled, sheet scrap	11.50 to 11.75
Iron axles	22.00 to 22.50
Old iron rails	15.00 to 15.50
Stove plate	9.00 to 9.50
No. 1 wrought scrap	13.50 to 14.00
Old car wheels	13.25 to 14.50
Low phosphorus	15.00 to 15.25
Machine shop turnings	10.00 to 10.50
Cast borings	10.00 to 10.25
No. 1 cast scrap	12.50 to 12.75

CHICAGO

Great Activity in Mill Operations

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., May 21.

Quietness in the pig iron market coupled with a continued sustained high rate of activity in mill operations characterize the situation in the west at present. Mills rolling plates and shapes are falling further behind on their delivery and some companies are offering nothing better than the middle of September, while others are able to make shipments on certain sizes in eight weeks. New business, while heavier than it was during the dull periods of last year, is very light compared with the recent rush of buying. It appears that most of the larger consumers are well covered for their early requirements and a further buying movement is not expected for at least 30 days. A great many contracts expire on July 1 and these will be renewed in due course. None of the steel companies is actively seeking business at present, owing to the crowded condition of their plants. The efforts of the leading interest to strengthen prices on fabricated material have evidently not met with great success, as practically all of the tonnage placed in the west recently has been taken by independents.

Pig Iron.—The market is very quiet, although foundries are taking out shipments promptly and there is a fair run of small orders for immediate delivery. The consensus of opinion in the market seems to be that most melters are well covered for the months of May and June, but that there is still a considerable tonnage for last half delivery to be placed. Practically the only sale of consequence during the past week was a transaction involving 1,500 tons of 9 per cent silicon iron. This was purchased for third quarter delivery by a local manufacturer of valves and fittings from a Jackson county furnace at a price understood to be slightly in excess of $18.40, delivered. There is an inquiry for 3,000 tons of foundry iron in the local market and the basic business mentioned last week is still pending.

The following prices represent the market for Chicago delivery, except northern foundry No. 2 and malleable Bessemer, which are quoted f. o. b. local furnaces:

	Third quarter.	Last half.
Lake Superior charcoal	$15.75	15.75
Northern foundry No. 2	14.50	14.50
Southern foundry No. 2	15.35	15.60
Southern silv'ries, 5 per cent sil.	16.10	16.35
Jackson co. silveries, 8 per cent	17.90	17.90
Malleable Bessemer	14.50	14.50
Alabam basic	15.35	15.60

Billets.—Chicago producers are now an almost neglible factor in the crude steel market, no mills in this territory having any quantity for sale. A few small orders for forging billets have recently been taken by a local mill. We quote, open-hearth forging billets, $28, Chicago; re-rolling billets, $24.

Merchant Bars.—Bar iron seems to be well maintained at 1.25c, Chicago, and the leading producer in this territory is booked two months ahead. In general the merchant steel situation shows very little change over conditions prevailing a week ago. Deliveries continue to be the paramount factor of interest and from six to eight weeks is now the minimum on steel bars. Shafting is firmer and is quoted at present 65 per cent off the list for carloads and 62 per cent for less than carloads. The demand for both hard and soft steel for concrete reinforcing has expanded greatly in the past 60 days and the mills making twisted bars have all of this business that they can take care of for some time to come. Western manufacturers of nuts and bolts have revised their quotations and raised prices to conform to advances recently announced in the eastern market.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.25c; hard steel bars, rerolled, 1.25c to 1.30c; soft steel bars, bands and small shapes, 1.38c base; hoops, 1.48c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 65 per cent off list for carload lots, 62 per cent off for less than carloads.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.50c to 1.60c per pound base; soft steel bars, 1.60c to 1.65c per pound base; soft steel hoops, 1.80c to 1.90c, full extras.

Structural Material. — Fabricating prices are still somewhat unsatisfactory to the contractors and have not advanced in harmony with the increases in quotations on shapes and plates. The leading interest has been making efforts to strengthen the market, but has apparently not been crowned with great success, inasmuch as all of the contracts recently reported have been placed with independent fabricators. Prices on plain material are very firm. The only large project pending in this district is the new county hospital, Chicago, for which 8,000 to 10,000 tons of shapes will be required. The Northern Pacific railway has let 1,000 tons to the Fort Pitt Bridge Co. for a bascule bridge and the Great Northern has let 2,200 tons to the same fabricator for a similar bridge. A building for the Illinois Wall Paper Mills, Chicago, will require 1,197 tons of bars and shapes for concrete

reinforcement. The Granby Mining Co., East St. Louis, has let 238 tons for a power house to a St. Louis fabricator. The Vierling Steel Co., Chicago, has taken 429 tons for a new Y. M. C. A. building. Other structural contracts let recently include a building for the Western Clock Co., La Salle, Ill., 344 tons, to the Indiana Bridge Co., and highway spans across the Estrella river, San Luis Obispo county, Cal., 102 tons, to the Joliet Bridge & Iron Co.

We quote mill prices, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.43c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $1.70 to $1.75 per 100 pounds; angles over 6 inches, $1.75 to $1.80 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.70 per 100 pounds, base; channels, 3 inches and larger, $1.70 per 100 pounds, base.

Rails and Track Fastenings.—It is understood that the Frisco system increased its rail order from 28,000 to 30,000 tons. These will be rolled by the Illinois Steel Co. The Soo line has placed 10,000 tons with the same maker and the Missouri Pacific has also ordered 6,500 tons and is understood to be in the market for about 25,000 tons additional. The business now on rail makers' books, together with that in prospect, is sufficient to keep the mills operating at a good gait throughout the summer. Supplementary orders for track fastenings have been heavy recently.

We quote, light rails f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.20c to 1.25c; 16 to 20-pound, 1.25c to 1.30c; 12-pound, 1.30c to 1.35c; 8-pound, 1.35c to 1.40c.

Light section relayers, 45 pounds and under, subject to inspection $21 to $23; standard section relaying rails, subject to inspection, $23.50 to $24.

Track fastenings, f. o. b. Joliet, angle bars, 1.50c; railroad spikes, 1.55c to 1.60c, smaller size spikes, 1.65c, base; track bolts with square nuts, 1.95c to 2.05c base.

Plates.—The western mills are daily finding it more difficult to take care of their plate orders promptly. Some makers at the present time are not promising delivery on ordinary specifications earlier than the middle of September, while others are able to make deliveries of certain sizes in eight weeks. Plate makers are not seeking any business; the market is firm and some advance in price seems imminent. Some additional car business is still pending in the west, including an inquiry for 2,500 50-ton steel gondola cars from the Illinois Central and 1,000 cars of the same kind from the Chicago & Northwestern. The Alabama, Tennessee & Northern railway has ordered 250 freight cars from the American Car & Foundry Co. and the Great Northern has formally announced an order for 1,000 wooden ore cars and 500 automobile cars from the Haskell & Barker Car Co. The American Refrigerator Transit Co. is understood to be in the market for 1,000 refrigerator cars in addition to the order recently placed with the American Car & Foundry Co.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 65⁄8 to 100 inches wide, 1.43c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $1.70.

Sheets.—Mills are being badly crowded on deliveries and prices are ruling strong. The volume of orders for sheets from warehouses is also improving. Car builders having orders for large numbers of refrigerator cars are buying heavily.

We quote, store prices, as follows:

Blue annealed, No. 10, 2.00c; No. 12, 2.05c. Box annealed, No. 28, 2.35c. Galvanized, No. 28, 3.45c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—The tone of the wire market is considerably improved and orders on a basis of 1.60c, Pittsburgh, for wire nails are more frequent, although most of the shipments are on contracts placed at $1 a ton under this figure. Weather conditions have improved materially in the west recently and the movement of agricultural wire is much improved.

We quote, f. o. b. Chicago, as follows: :

Wire nails, jobbers' carload lots, $1.78; retailer's carload lots, $1.88; retailers' less than carload lots. $1.98; painted barb wire, jobbers' carload lots, $1.78; retailers' carload lots, $1.88; retailers' less than carload lots, $1.98, with 30c for galvanizing; plain wire, jobbers' carload lots, $1.58; retailers' carload lots, $1.63.

Merchant Pipe and Tubes.—The local market on merchant pipe shows practically no change, there being a fair demand for the more commonly used sizes and no concessions in prices. The market for boiler tubes is quiet, but specifications on contracts are heavy and mills are operating at a better gait.

We quote, store prices on merchant pipe and tubes, f. o. b. Chicago, as follows:

Iron and Steel Pipe Basing Prices.

	Steel. Black.	Iron. Galv.	Steel. Black.	Iron. Galv.
Butt.				
⅛ inch and ¼ inch.	71.2	50.2	63.2	42.2
⅜ inch	75.2	64.2	68.2	52.2
¾ inch to 1½ inch..	78.2	69.2	71.2	59.2
Lap.				
2 inch	76.2	68.2	68.2	58.2
4½ inch to 6 inch..	77.2	68.2	69.2	60.2
Card Weight.				
7 inch to 12 inch...	74.2	63.2	67.2	56.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	66.2	54.2	60.2	48.2
½ inch	71.2	59.2	65.2	53.2
2 inch to 3 inch....	76.2	64.2	....	....
Lap.				
2 inch	72.2	60.2	66.2	54.2
7 inch to 8 inch....	66.2	54.2	60.2	48.2
Double Extra Strong.				
Butt.				
½ inch	59.2	47.2	....	....
¾ inch to 1½ inch.	62.2	50.2	....	....
Lap.				
2 inch	60.2	48.2	....	....
4½ inch to 6 inch..	61.2	49.2	....	....
7 inch to 8 inch....	54.2	42.2	....	....

Tubes.

	Lap weld steel. Per cent.	Charcoal iron. Per cent.	Shelby seamless. Per cent.
1 inch	39	..	57½
1¾ to 2¼ inch.....	55	40	35
2¾ to 3¼ inch.....	65	50	46
3½ to 4½ inch.....	67½	50	46
5 to 6 inch.....	55	..	..

Cast Iron Pipe.—The market has been somewhat quieter recently. The United States Cast Iron Pipe & Foundry Co. was awarded 1,100 tons of 6 and 4-inch water pipe at Webster-Groves, Mo. The village of Ashton, Ill., is in the market for six miles of 4, 6 and 8-inch water pipe. Shakopee, Minn., will open bids May 28 on 3,000 feet of 6 and 8-inch water pipe.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $27.00, 6 to 12 inches, $25.00, larger sizes, $24.50; gas pipe, $1 a ton higher.

Old Material.—The scrap market presents but few features of interest. Some dealer's forge recently changed hands at $10 per ton, which indicates a slight recession on this item. The Chicago & Eastern Illinois has issued a list amounting to 400 tons, on which bids were opened May 21. The principal item in this was 150 tons of No. 1 railroad wrought. Sales of this material have been rather free lately at $13, Chicago, although it is believed some tonnage is still available at $12.75. Agricultural malleable is somewhat firmer.

We quote, for delivery in consumers' yards, Chicago, as follows:

Gross Tons.

Old car wheels	$13.25 to 13.75
Old iron rails	16.50 to 17.00
Rerolling rails (5 ft. and over)	13.00 to 13.50
Old steel rails (3 ft. and under)	12.25 to 12.75
Frogs, switches and guards	12.00 to 12.50
Heavy melting steel	12.00 to 12.50
Shoveling steel	11.75 to 12.25

Net Tons.

No. 1 R. R. wrought	$12.75 to 13.25
No. 2 R. R. wrought	11.75 to 12.25
Arch bars and transoms	15.00 to 15.50
Knuckles, couplers and springs	11.50 to 12.00
Shafting	14.50 to 15.00
Iron car axles	19.00 to 19.50

Steel car axles	15.75 to 16.25
Locomotive tires	13.50 to 14.00
Dealers forge	10.00 to 10.50
Pipe and flues	9.00 to 9.50
No. 1 cast	12.00 to 12.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.25 to 7.75
No. 1 boiler cut	8.25 to 8.75
Boiler punchings	12.50 to 13.00
Cast and mixed borings	6.50 to 7.00
Machine shop turnings	7.25 to 7.75
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00
Angle bars, splices, etc., iron	13.50 to 14.00
Angle bars, steel	11.50 to 12.00
Stove plate and light cast scrap	10.00 to 10.50

Neville Island Plant Completed

The Neville Iron Co., of the Curry building, Pittsburgh, has about completed the erection of buildings and equipment at its new plant on Neville island. The company is to engage in the scrap metal business, and will have an electrically-operated crane, metal breakers, shears and hydraulic machinery for compressing sheet metal scrap into bundles. About three acres of ground is covered by the plant.

The capital stock of the Pennsylvania Forge Co., Philadelphia, has been increased from $50,000 to $100,000. J. Ralph Davis is secretary of the company.

CINCINNATI

Prices on Ironton Pig Iron Weaken

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., May 21.

Pig Iron.—The principal feature in the market during the past week has been the gradual weakening of prices on southern Ohio grades, until the general quotation has been reduced from $13.50 to $13.25, Ironton, for No. 2 foundry. This has been caused by the continued cutting of prices that has been going on in that territory for some time, and the scarcity of business. Following the recent advance in northern iron from $13 to $13.50, the Ironton group of furnaces until recently stood fairly firm at this higher quotation, despite the fact that certain central and northern Ohio furnaces soon began to batter the market and to book, except in one or two cases, practically all of the larger inquiries. Recently, however, certain furnaces from the Hanging Rock district have repeatedly closed contracts at from $13 to $13.25, furnace, but mostly at the latter price, until today buyers in this territory will not pay more than the latter quotation for foundry iron. This condition, however, is not expected to last for any period of time, as the high prices of furnace coke and the fact that a number of large users in this territory have not as yet closed for their second half requirements, will probably force these prices back to the former high level. The market for both northern and southern grades is quiet, and inquiries and sales are small. Prices in the south, though, are holding well, and $11, Birmingham, for No. 2 foundry iron, still prevails for spot and third quarter shipment, although some firms will not sell below $11.25 for third quarter, and $11.50 for the fourth. Very little iron is selling for $11.50, but some contracts have been closed at $11.25 for the last half, especially the last quarter. There is a good demand for ferro-manganese, and some fair lots have been sold, but not enough is attainable to fill the demand. High silicon iron is also selling better, and $16, furnace, or $17.20, Cincinnati, is the lowest price some dealers will make on 8 per cent grades. While $15.50 and $15.75, furnace, is being done in some cases, the market generally favors the higher quotation. The Globe Iron Co., Jackson, O., will blow out its furnaces shortly and will make extensive repairs on its plant. There is an inquiry in the market here today for upwards to 500 tons of southern iron for last half shipment, from a northern Kentucky user, and another large manufacturer from the same territory will buy a fair tonnage soon. It is believed that quite a number of small sales that would aggregate a good amount are being made on the quiet, and that this is one of the factors that has held the southern market to the present price. With freight rates from Birmingham, $3.25, and from Ironton, $1.20, we quote Cincinnati prices as follows:

Southern foundry No. 2	$14.25 to 14.50
Southern foundry No. 3	13.75 to 14.00
Southern foundry No. 4	13.50 to 13.75
Southern gray forge	13.00 to 13.25
Mottled	12.25 to 12.50
Southern No. 1 soft	14.25 to 14.50
Southern No. 2 soft	13.75 to 14.00
Standard southern car wheel	25.25 to 25.50
Northern No. 2 foundry	14.45 to 14.70
Northern No. 3 foundry	13.95 to 14.20
Northern No. 4 foundry	13.45 to 13.75
Jackson co. 8 per cent silicon	16.70 to 17.20

Coke.—The local coke market is still a little unsettled, but prices are holding well, especially on furnace grades. There is a good demand for 48-hour coke and inquiries in this market for this brand will average from 350,000 to 400,000 tons a week. Contracts are being made at from $2.25 to $2.40 for Connellsville furnace coke, and what little foundry business is being done is being taken at from $2.50 to $2.75 for 72-hour grades from this same district. It is hardly time for large contracting of foundry coke to begin as the old contracts have not expired, and a general buying movement cannot be expected until near June 1. The efforts of certain makers to start a number of new ovens are still handicapped because of the scarcity of laborers, which condition apparently exists in all of the fields. During the past week, several large additional users who, as was the case of those reported last week, have been refusing to buy for their future requirements because of the present high prices, are beginning to contract for good tonnages. We quote from the leading coke-producing districts as follows:

	Prompt shipment.	Contract second half.
Connellsville district:		
Foundry coke	$2.50 to 2.75	$2.50 to 2.75
Furnace coke	2.25 to 2.40	2.25 to 2.40
Wise county district:		
Foundry coke	$2.50 to 2.75	$2.50 to 2.75
Furnace coke	2.00 to 2.25	*Sliding [scale basis
Pocahontas district:		
Foundry coke	$2.50 to 2.90	$2.50 to 2.90
Furnace coke	1.85 to 2.25	1.85 to 2.25
New river:		
Foundry coke	$3.00 to 3.25	$3.00 to 3.25
Furnace coke	2.35 to 2.50	2.35 to 2.50

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over $9 which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—Steel bars and structurals are holding firm, the former at 1.20c and the latter at 1.25c, Pittsburgh basis. Business has been good during the past week, and several local offices report that the contracts they have closed will aggregate a large tonnage. The sheet market is likewise holding well, and prices, if anything, are a little firmer. The

local mill reports a good business and specifications are better than for some time. Prices are as follows, all Pittsburgh basis: Black sheets, No. 28, 1.95c, and galvanized No. 28, 3c. The date for the letting of the contract for the new Gibson house, this city, has been extended to May 27. The local machinery market at present seems to be experiencing a good business streak, and most manufacturing firms are placing a fair number of orders. Lathes appear to be the best in demand among machine tools, but milling machines are selling well also. For mill prices, see Pittsburgh report.

Warehouse business during the past week has been better than for some time, and specifications are coming in to local houses in good shape. Prices are firm and are as follows, f. o. b. Cincinnati:

Steel bars, 1.65c base; iron bars, 1.60c base; structurals, 1.75c base; plates, ¼ inch and over, 1.75c base; sheets, blue annealed No. 10, 1.95c base; rivets, cone head, 2.30c base; cold rolled shafting, 60 per cent discount; boiler tubes as follows: 1¾ to 2¼ inch, 60 per cent discount; 2½ inch, 62 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 67 per cent discount; and 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 1.75c; ⅝ inch square and larger, 1.85c; ½ inch square and larger, 1.95c; 5-16 to ⅜ inch square and larger, 2.15c; ¼ inch square and larger, 2.25c.

Old Material.—The scrap iron market is a little stronger, and prices have a tendency to go higher, although all dealers have not advanced them as yet. Buyers in some cases are hesitating to pay the prices asked by dealers, but the latter are generally holding fairly firm. Mixed scrap has been selling in fairly good lots, and has been bringing from $9 to $9.25, delivered at dealers' yards. Bundled sheet scrap is also reported to have sold recently at $9, but this does not include the cost of delivery to yards. We quote prices dealers will pay in Cincinnati and vicinity, as follows:

Gross Tons.

Old iron rails	$12.75 to 13.25
Old steel rerolling	11.50 to 12.00
Old iron axles	19.50 to 20.00
Heavy melting scrap	10.50 to 11.00
Car wheels	11.00 to 11.50
Bundled sheet scrap	8.75 to 9.25

Net Tons.

Old No. 1 R. R. wrought	$10.50 to 11.25
No. 1 machinery cast	10.25 to 11.00
No. 1 bushelling	8.50 to 9.00
Stove plate	7.50 to 8.25
Machine shop turnings	7.00 to 7.50
Cast borings	6.50 to 7.50
Heavy turnings	6.50 to 7.50
Mixed cast	8.25 to 9.25

CLEVELAND

Sale of Billets---Steel for New Boats

Office of THE IRON TRADE REVIEW,
Penton Bldg., May 21.

Iron Ore.—The movement of iron ore has greatly improved within a few days and it seems probable that, in spite of the poor beginning made this month, the May shipments will make a very good showing and the movement up to June 1 will probably exceed 5,000,000 tons. Vessel owners are finding there is very little, if any, profit at prevailing carrying charges on iron ore, based on 40 cents net from the head of the lakes. Those who still have some vessel capacity to place under contract are hopeful that higher rates will prevail later in the season.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $3.75; Mesabi Bessemer, $3.50; old range non-Bessemer, $3.05; Mesabi non-Bessemer, $2.85.

Pig Iron.—While some foundrymen are still hesitating about contracting for their last half requirements, there is a steady flow of business and prices, while not quotably higher, are firm. One Cleveland firm, which made some very low prices a few weeks ago, is quoting considerably higher than it did. In Toledo, No. 2 foundry is selling at $13.50 to $13.75, furnace. We quote, delivered in Cleveland, as follows, for last half:

No. 1 foundry	$13.75
No. 2 foundry	13.25
No. 2 southern	15.35
Gray forge	12.75
Bessemer	15.15
Lake Superior charcoal	15.50
Jackson co. 8 per cent silvery	16.00

Coke.—On an inquiry for a large tonnage of foundry coke for last half delivery, $3.00 was quoted, but this is at least 25 cents above the usual quotation. Some furnace operators express their confidence in being able to contract at $2.25, but it is doubtful whether less than $2.35 could be done on high grade coke. We quote:

Connellsville furnace coke, $2.25 to $2.35 for prompt delivery, and $2.40 to $2.50 on contract; Connellsville foundry coke, $2.50 to $2.75 for prompt, and $2.50 to $2.75 on contract.

Finished Material.—Mills report a gratifying volume of specifications and an increase in new business. A leading steel company has found itself unable to turn out enough billets to meet its own requirements and has purchased 6,000 tons from a local company. There is a scarcity of crude steel in the Chicago market and buyers in that territory are endeavoring to contract from the Cleveland sellers. One inquiry for 5,000 tons of forging billets is pending here.

Some sheet mills are apparently hungry for business. These mills seem to have been conservative about making contracts before recent advances were announced and for this reason are able to take on some tonnage. Owing to the fact that all consumers of consequence are covered by contracts, there is not enough business going fully to test the market, but the ordinary quotations, 1.95c for No. 28 black and 3.00c for No. 28 galvanized, are being shaded a dollar a ton on desirable business.

The Carnegie Steel Co. has been awarded 3,500 tons of shapes and plates for two oil barges, to be built by the American Ship Building Co., at Lorain, for the Standard Oil Co., and 3,000 tons for a boat to be built for the Northern Navigation Co., of Toronto, by the Western Dry Dock & Steamboat Co., Port Arthur. The contract for the latter boat was placed some time ago, but the plain material has just been ordered. A Nickel Plate bridge at Buffalo will require 1,400 tons of structural material. The Great Lakes Dredge & Dock Co. was the low bidder on the piers for this bridge. The contractor for the piers for the new Cleveland high level bridge across the Cuyahoga will soon contract for about 800 tons of sheet piling. The county commissioners will ask for bids next week on the span for the bridge, which will require about 3,500 tons of steel. There is some cutting of prices by fabricators.

Demand for bar iron in the Cleveland territory has improved and the quotations have been advanced $1 per ton, the usual quotation now being 1.25c. The iron mills are having considerable trou-

ble in getting labor and for that reason are not working to their full capacity.

Old Material.—The receipt of an order for 5,000 tons of heavy melting steel, part of which came to Cleveland, for delivery at Alliance, O., has stimulated the local market. It is understood that $14, delivered, was paid, this netting $13, Cleveland. Both Sharon and Canton are also out for steel. The quantity shipped out of Cleveland is reducing stocks here steadily. The prevailing quotation today on heavy steel is $12.25 to $12.75, a local consumer offering $12.25. Busheling is in more demand, two local mills offering $11. The local market generally shows more life than in months. We quote, gross tons, f. o. b. Cleveland, as follows:

Gross Tons.

Old iron rails	$14.00 to 14.50
Old steel rails (under 6 ft.)	12.75 to 13.25
Old steel rails (over 6 ft.)	13.25 to 13.75
Relaying rails	19.50 to 20.00
Old car wheels	13.00 to 13.50
Old steel boiler plate	10.00 to 10.50
Malleable iron (railroad)	12.50 to 13.00
Steel axles	17.00 to 17.50
Axle turnings	10.00 to 10.50
Malleable iron (agricultural)	10.00 to 10.50
Heavy steel	12.25 to 12.75
Country mixed steel	10.50 to 11.00
Bundled sheet scrap	8.50 to 9.00

Net Tons.

No. 1 R. R. wrought	$12.00 to 12.50
No. 1 busheling	11.00 to 11.50
No. 1 machine cast	11.00 to 11.50
No. 1 dealers' wrought	10.00 to 10.50
Machine shop turnings	7.50 to 7.75
Pipes and flues	9.50 to 10.00
Wrought drillings	7.50 to 7.75
Stove plate	9.50 to 10.00
Cast borings	7.75 to 8.00
Wrought iron piling plate	14.50 to 15.00
Wrought iron arch bars	14.00 to 14.50

PHILADELPHIA

Active Mills and Fair Buying in the East

Office of THE IRON TRADE REVIEW, Philadelphia, May 21.

Active operations, liberal specifications and a considerable volume of new business continues to mark conditions of finished iron and steel in the east. Some price irregularities remain. Eastern mills are shipping a considerable tonnage of open-hearth billets to Pittsburgh steelmakers to relieve the shortages in that district, and an additional order for 10,000 tons of billets for such delivery has just been booked by an eastern Pennsylvania works. Pig iron is most active in basic and pipe-making grades. Basic sold this week at $15.25, delivered, and about 15,000 tons of pipe iron was booked, some of it at higher prices. Scrap is quieter with some grades showing further weakness.

Pig Iron.—Record lot selling of iron continues to be done mainly for third quarter and much of this is in basic and pipe-making grades. Foundry iron is comparatively quiet at firm prices. In basic, a central Pennsylvania consumer has closed for 5,000 tons for third quarter at $15.25, delivered, and a sale of 2,000 tons additional for similar delivery to another eastern buyer at a higher freight point at $15.50, delivered, is noted. The recent purchases of 20,000 to 25,000 tons for third quarter by a leading eastern steelmaker at $15, delivered, seems to have about exhausted the supply of forward iron available at this price and the market for third quarter can probably now be considered at a minimum of $15.25, delivered. Other basic negotiations continue. Pipe iron is enjoying a strong demand and sales of the week aggregated about 15,000 tons. Prices incline toward advance because of the rather limited supply. Works along the Delaware river took 4,500 tons for shipment over the next several months, made up of northern, Virginia and southern grades. Some of the high sulphur northern forge was sold at $14.50, delivered, and considerable of the more standard analysis material at $14.75, delivered. Several other thousand tons were sold to the same district and upon some of this higher than $14.75 was received. Another eastern Pennsylvania pipe maker took 1,500 tons of northern off grades for forward shipment. A Virginia pipe shop closed for 6,000 tons of forge and No. 3 for third quarter from a leading Virginia maker at $12.25 and $12.50, respectively. A locomotive builder in this city is still negotiating for 1,500 to 2,000 tons of practically No. 3 for shipment running through the third quarter. The Norfolk & Western railroad is inquiring for 4,500 tons for last half for Norfolk delivery, which includes 1,800 tons of No. 2X, 600 tons of No. 1, 450 tons of No. 3, 1,200 tons of charcoal, 450 tons of special foundry. Eastern Pennsylvania No. 2X foundry irons continue to range from about $15.10 to $15.40, delivered. Virginia iron remains firm at $13, furnace, for No. 2X. Small sales of low phosphorus iron have been made at $20, Philadelphia. The Oxford, N. J., furnace is awaiting the arrival of coke to resume and will do so in a few days. The large Warwick alternate stack A blew in this week. One of the Bethlehem furnaces has gone out.

We quote for prompt and third quarter delivery in Philadelphia and vicinity as follows:

Eastern Pa. No. 1X foundry	$15.25 to 15.50
Eastern Pa. No. 2X foundry	15.10 to 15.25
Eastern Pa. No. 2 plain	14.60 to 14.85
Standard gray forge	14.50 to 14.75
Basic (Eastern and Central Pa.)	15.00 to 15.25
Virginia No. 2X	15.80
Southern No. 2	15.00 to 15.25
Standard low phosphorus	19.75 to 20.00

Finished Material.—Liberal specifications against contracts are being received without exception by eastern mills. A good many of these contracts booked at former low prices will expire July 1, but a number of them have been extended to Oct. 1. The miscellaneous new business of which there is a considerable volume, is being entered in the main at prices of about $2 a ton above these contracts, so that the average earning rate is somewhat improved. Some buyers are inclined to make contracts at the current price level. The new business appearing and the active specifications continue to keep capacity quite fully engaged. The plate mills are operating at 85 to 95 per cent, the shape mills at 75 to 85 per cent and other plants at about 75 to 85 per cent.

Plate prices, which continue to show more strength than shapes, are firmer around 1.40c, Philadelphia, or 1.25c, Pittsburgh, than they have been. Shapes, which are dragging behind the market, still show keen competition among eastern and western Pennsylvania mills and 1.20c, Pittsburgh, or 1.35c, Philadelphia, is still quite freely quoted. Steel bars are firm at full prices. Bar iron rules from 1.30c to 1.35c, Philadelphia, or 1.22½c to 1.27½c, eastern mill. Some makers of railroad spikes have advanced their prices $1 to 1.45c,

Pittsburgh. Philadelphia jobbers this week put up warehouse schedules $2 to 1.75c for plates, shapes and bars. In Baltimore and Richmond the ruling warehouse price is now 1.85c.

The Thompson-Starrett Co. has taken the general contract for the Arlington hotel, Washington, 1,800 to 2,000 tons, and the steel is yet to be awarded. Bids also went in this week on the Harrington Mills hotel, Washington, 600 tons, and on the Murphy hotel, Richmond, 1,300 tons. The addition to the Cramp ship building plant, this city, 1,600, is about to be placed. Other pending work in the territory upon which final action is awaited includes 1,600 tons for the Vendig hotel, 900 tons for the Bellevue-Stratford garage, both this city, and 800 tons for the Wallerstein hotel, Richmond. The large pier soon to be put out by the Chesapeake & Ohio railroad will be at Newport News instead of Norfolk, as previously stated.

Pittsburgh steel makers continue to call upon eastern Pennsylvania producers for round tonnages of open-hearth semi-finished steel to relieve the shortages in that district. A Schuylkill valley mill which has been shipping considerable steel to Pittsburgh has just taken another contract for 10,000 tons of billets for a leading manufacturer in the latter territory. Eastern mills are quoting open-hearth billets on the range of $23.40 to $24.40, Philadelphia, or $21 to $22, Pittsburgh.

We quote delivered in Philadelphia and vicinity as follows:

Plain structural shapes, 1.35c to 1.40c; tank plates, 1.35c to 1.40c; steel bars, 1.35c; common bar iron, 1.30c to 1.35c; cut nails, 1.65c to 1.70c; blue annealed sheets, No. 10 gage 1.55c to 1.60c; 4 x 4-inch open-hearth rolling billets, $23.40 to $24.40; forging billets, $27.40 to $28.40. Extras shown under Pittsburgh report. Philadelphia warehouse prices 1.75c for plates, shapes and bars.

Ship Building Work.—No action is announced on the award of one to four coastwise fruit steamships upon which bids have gone in from eastern ship yards. Each of these boats will require about 3,000 tons of plates and 1,500 tons of shapes, or 18,000 tons if four vessels are built. The Maryland Steel Co. will launch in June two of the eight large ships building for the American-Hawaiian Steamship Co. Each of these vessels is 428 feet in length by 53½ feet beam.

Old Material.—The scrap market shows an easier tone and new buying by consumers is light as none of the large eastern Pennsylvania buyers are now actively in the market. Weaker prices still continue in borings and turnings and in wrought pipe, and are particularly pronounced in the two former grades. Heavy melting steel is holding up quite well in prices, though bargain-lot taking in small lots is being done by some of the mills at minimum prices. There is considerable buying of steel among dealers. The cast iron pipe makers and leading industrial plants have been making additional purchases of car wheels at about $14, delivered.

We quote, gross tons, delivered at consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (rerolling)	14.75 to 15.25
No. 1 heavy melting steel	13.50 to 14.00
Old car wheels	13.75 to 14.00
Old iron axles	23.00 to 24.00
Old steel axles	17.50 to 18.00
No. 1 railroad wrought	16.00 to 16.50
Wrought pipe	12.50 to 13.00
Cast borings	9.00 to 9.50
Machine shop turnings	10.00 to 10.50
Heavy cast	13.50 to 14.00
Malleable	11.75 to 12.25
Stove plate	10.50 to 11.00
No. 1 forge	12.00 to 12.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

BIRMINGHAM

Good Inquiry for Pig Iron Pending

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., May 21.

Pig Iron.—For such business as is being placed, a schedule of $11 per ton, Birmingham, is being fully maintained, but in the majority of recent transactions, comparatively small lots for early delivery were the considerations. There is considerable inquiry pending for tonnage to cover the remainder of the year, and for last quarter delivery only; but advanced deliveries are considered with some reluctance by all of the several producing interests, and it is not believed that a lower price than $11.50 per ton at Birmingham could be had on any tonnage for the last quarter. Such figures as just named are being quoted by certain concerns for third quarter shipments, while others would not accept spot orders at a lower price, owing to the present condition of order books. It is quite probable that considerable of the tonnage sold for shipment in the second quarter will have to be carried over into the third quarter, and it is generally conceded that certain interests have sold heavily for the third quarter. The market is quoted firmly as follows:

For delivery prior to last quarter:

No. 1 foundry	$11.50 to 11.75
No. 2 foundry	11.00 to 11.25
No. 3 foundry	10.50 to 10.75
No. 4 foundry	10.00 to 10.50
Gray forge	9.75 to 10.25
Mottled	9.50 to 10.00
Standard basic	10.75 to 11.25
Off basic	10.50 to 10.75
Standard charcoal	22.50 to 23.00

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

For delivery in the last quarter, an advance of 50 cents per ton is quotable over the above, with the exception of the price quoted for charcoal iron, which price covers the remainder of the year.

Cast Iron Pipe.—No contracts of importance have been awarded manufacturers since last report. A liberal volume of small orders was placed in the week, and the prices are considered satisfactory in view of other conditions existing. The output at all local plants in operation is being moved promptly, without excessive stocks of any particular sizes. In the absence of evidence to the contrary, the market is considered correctly represented as follows, for water pipe, per net ton, f. o. b. cars here, viz.: 4-inch to 6-inch, $23; 8-inch to 12-inch, $22; over 12-inch, average $21, with $1 per ton extra for gas pipe.

Old Material.—Dealers are more anxious to accumulate stocks than for many months past. Practically all grades are being stocked when available, although the principal movement consists of wrought and steel grades. Advances for light cast, and for machinery cast, have been realized, with car wheels and axles much stronger. We quote as follows, prices that dealers are asking for their holdings, viz.:

Old iron axles (light)	$13.50 to 14.00
Old steel axles (light)	12.00 to 12.50
Old iron rails (scrap)	12.00 to 12.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	11.00 to 12.00
No. 1 country	9.50 to 10.00
No. 2 country	9.00 to 9.50
No. 1 machinery	9.50 to 10.00
No. 1 steel	9.00 to 9.50
Tram car wheels	9.00 to 9.50
Standard car wheels	11.00 to 11.50
Light cast and stove plates	7.50 to 8.00

NEW YORK

Market Quiet, But Tone is Strong

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., May 21.

Iron Ore.—Chartering of a cargo of Spanish ore from Sagunto, to Philadelphia, by the steamer Horfleur, has just been done at 9s 6d. This cargo is a part of the sales of Sagmanera, Spanish, ore recently referred to. Inquiries continue current from eastern furnaces for about 25,000 tons of foreign ore at offers of 7 cents per unit, Philadelphia, but sellers find themselves unable to take the business on these terms.

Pig Iron.—The market generally in metropolitan, New Jersey and lower New England territory is quiet and inquiry is small, but there continue under way a few negotiations by important buyers. A large machinery builder is buying against an inquiry of 3,000 to 4,000 tons of various foundry grades for last half delivery to eastern and middle western plants and has also revived an inquiry for a round tonnage for export to England. The Baldwin Locomotive Works is understood to have closed for about 4,000 tons of low grade foundry iron for delivery through the third quarter. Its inquiry was for 1,000 to 2,000 tons of special forge grade. An eastern buyer at a distant point has increased a recent order with an eastern Pennsylvania furnace for basic by 2,000 tons, which is for early delivery at about $15.50, delivered. Canadian consumers have been placing additional orders with Buffalo makers and one sale of 1,000 to 2,000 tons of foundry grades is noted. Some Lehigh and Schuylkill Valley makers continue to sell for forward delivery in a cautious manner and will not consider business under $14.75, furnace, for No. 2X. Other eastern Pennsylvania makers will still accept orders below this price. The tidewater market is quotable at about $15.25 to $15.50 for No. 2X. Central Pennsylvania makers are holding No. 2X at $13.75, furnace. Buffalo iron is firm at minimum of $13.50, furnace, for No. 2X. Several changes in eastern furnace operations are about to be made. The Hellertown stack of the Thomas Iron Co. will probably soon resume and the active furnace of the Worth Bros. Co. is expected to go out. The Oxford, N. J., furnace will blow in next week and the Buena Vista stack in Virginia will also become active in the near future. A fire in the engine house of the E. & G. Brooke Iron Co., Birdsboro, Pa., will delay the blowing in of one of the furnaces of the plant. Warwick furnace A, at Pottstown, is going in this week on special Bessemer. We quote at tidewater for prompt and third quarter shipment as follows, southern and Virginia iron being given at New York docks:

Northern foundry No. 1	$15.50 to 15.75
No. 2X foundry	15.25 to 15.50
No. 2 plain	14.75 to 15.00
No. 2 Virginia	15.80 to 16.05
No. 2 southern foundry	15.00 to 15.25
Malleable	15.25 to 15.50
Gray forge	14.50 to 14.75

Ferro-Alloys. — Several thousand tons of ferro-manganese for forward shipment have been sold at the new price of $48.50, seaboard, including 1,500 tons to a middle western steel interest for first quarter. Most forward business taken is for first quarter and first half as makers are not offering tonnage freely this year, though some will accept business after October at ruling prices. Consumption of ferro-manganese is heavy and there is considerable interest astir among large buyers, which will probably result in round tonnage sales. Prompt ferro was sold this week at $53.00, seaboard, but this price could probably not be repeated and $58.00 to $60.00 is now quoted. New business in 50 per cent silicon is not heavy. We quote standard ferro-manganese for forward shipment at $48.50, seaboard, with premium prices ruling on prompt material and 50 per cent ferro-silicon at from $68.00 to $70.00, Pittsburgh.

Cast Iron Pipe. — Large inquiries for cast iron pipe are still awaited from New York City and present indications are that these will appear some time in June. A round tonnage is expected to be placed. Public lettings of pipe in the east are few, but private trade continues good. Prices are higher in individual cases and as pipe makers' pig iron costs are fully $1 higher than a year ago, the tendency is towards advanced quotations. Sharp competition, however, still invariably brings out some attractive figures. We quote 6-inch pipe at from $21.00 to $22.00, f. o. b. New York, in carload lots, some makers asking up to $23.00.

Finished Material.—Delivery considerations continue to be of increased importance in finished lines because of the heavily sold condition of many of the mills, particularly those in the Pittsburgh district. The result is the directing of a larger tonnage of early requirement business to the eastern mills not so well filled and to the warehouses. In the New York territory the warehouses are shipping very freely from stock and since the recent advance of $2.00 a ton, the volume has been heavily increased. Heavy specifications are general and while in some cases new business is not so marked in tonnage, there is a very satisfactory volume of trade and some of the larger interests report no diminution of the recent record-breaking movement.

Prices are substantially firm in most lines at the levels quoted by the larger interests, the possible exception being in shapes, where the range is unchanged at 1.20c to 1.25c, Pittsburgh, or 1.36c to 1.41c, New York. Eastern mills seem to be better upholding plate prices at 1.25c, Pittsburgh. Steel bars are strong at 1.20c, Pittsburgh, and eastern bar iron makers are holding their product quite firmly at advanced levels, which range from 1.32c to 1.37c, New York.

The shape mills are getting liberal orders from work already let but the volume of new structural undertakings being planned or under negotiation in the metropolitan district is not so heavy. Bids on the general contract went in today on the Biltmore Hotel, which is to be a part of the New York Central Terminal improvements. This is the largest single contract in sight and will require about 14,000 tons. Plans will shortly be out for the Adams Express Co. building on lower Broadway, which will be 30 stories or more in height and will call for a heavy tonnage. Revised plans are being prepared for the Eighth Artillery Armory and alterations to other armories in the metropolis, 8,000 to 9,000 tons, will shortly appear. Other important work pending includes 3,200 tons for a meter building for the Standard Gas Light Co. about to be closed.

The week's awards include 2,500 tons to the Pennsylvania Steel Co. for a bridge for the Pennsylvania railroad over the Monongahela river near Brownsville, Pa., and 1,400 tons to the Boston Bridge Works for the

Hampden Street Railway near Chicopee, Mass. The New York, Ontario & Western has 1,500 tons for bridges still pending. Levering & Gerrigues have taken 550 tons for the Seaman's Bros. warehouse on Hudson street. Bids have gone in on 500 to 600 tons for a loft for Victoria Realty Co. on West Twenty-second street. The Mallory Steamship lines are about to take figures for ten large steamships for coastwise service. We quote, delivered at New York tidewater, as follows:

Plain structural shapes 1.36c to 1.41c; tank plates, 1.36c to 1.41c; steel bars, 1.36c; common iron bars, 1.32c; steel bars from store, 1.80c; plates and shapes from store, 1.90c; extras as shown under Pittsburgh report.

Rails and Track Material.—A full meeting of the sub-committee of steel rail manufacturers and railroad executives which is considering the question of improved rail quality, was held in New York May 16. Progress is reported but it will probably be some time before any conclusions are reached. Western lines, including the Harriman system, continue to negotiate for further tonnages of rails. The season for the purchase of girder rails is now practically ended. The Southern Pacific has placed an order for 500 tons of girder rails with the Pennsylvania Steel Co.

Old Material.—The market is quieter and prices are easier, having declined from 25 to 50 cents in a number of grades. The larger consumers have apparently been well protected against their requirements for some time, by their recent purchases and their offers on new orders are at lower levels. Consumers' prices at present range from about $13.50 to $13.75, delivered in eastern Pennsylvania for heavy steel, $9.00, delivered for borings, $10 for turnings and about $16 delivered for steel shafting. Heavy cast with New Jersey foundries is about $12.50 to $13, delivered. We quote, gross tons, prices New York dealers will pay at tidewater, as follows:

Old car wheels	$11.25 to 11.75
Old iron axles	16.50 to 17.00
Old steel shafting	14.00 to 14.25
No. 1 heavy melting steel	11.00 to 11.25
No. 1 R. R. wrought	13.25 to 13.50
Wrought pipe	9.75 to 10.00
Cast borings	7.00 to 7.25
Machine shop turnings	8.00 to 8.25
Heavy cast	11.00 to 11.50
R. R. malleable	9.50 to 10.00
Stove plate	8.25 to 8.75
Grate bars	7.25 to 7.75

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City and $1.60 from New York; to Roebling, N. J.; $1.00 from Jersey City and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York.

BUFFALO

Malleable and Basic Prices Higher

Office of THE IRON TRADE REVIEW, Buffalo, May 21.

Pig Iron.—Prices are firmer on all grades, in malleable and basic the minimum having advanced 25c during the week. Buying and inquiries were lighter during this period than in the previous week, although there seems to be considerable interest manifested. The tonnage placed for the week was about 12,000 tons in scattered lots, mostly to medium and small users, the larger interests having covered their requirements. Furnace order books are getting close to the point of being completely filled. The probabilities are that prices will be advanced in the near future. The range of prices for the week, f. o. b. furnaces, is substantially as follows:

No. 1X foundry	$14.00 to 14.50
No. 2X foundry	13.75 to 14.25
No. 2 plain	13.50 to 14.00
No. 3 foundry	13.50 to 13.75
Gray forge	13.25 to 13.75
Malleable	14.25 to 14.50
Basic	14.25 to 14.50
Charcoal	15.50 to 16.00

Finished Material.—Specifications continue to come in freely, and prices are firmer, with no apparent sign of a break, and the indications are an additional advance on bars, shapes and plates will take place very soon. Inquiry is limited for most of the consumers of size in the territory covered their requirements before the last two advances. Mills are filled up to the point that tonnages have been refused where prompt shipment was asked for. The principal inquiry during the week was on bars, cold rolled steel and sheet steel piling. The Thompson-Starrett Co., New York, was low bidder on the new Buffalo Natural Gas Fuel Co.'s office building. The Buffalo Structural Steel Co. was given the contract for a small addition to the Buffalo Foundry & Machine Co. The Great Lakes Dredging & Dry Dock Co., Chicago, is the low bidder on the bascule bridge to be built by the federal government and the city of Buffalo at the foot of Ferry street, Buffalo, with a bid of $126,871. The International Traction Co. recently ordered 2,500 tons of 126-pound rails to be used in rebuilding road in Niagara street, Buffalo.

Old Material.—The only apparent demand for material in the Buffalo district continues to come from outside users. Local consumers are stocked, but are expected to be more or less active in a short time. The outside demand for No. 1 railroad wrought scrap and railroad malleable scrap has caused both commodities to stiffen materially in price during the past week. The range per gross ton, f. o. b. Buffalo, is as follows:

Heavy melting steel	$12.75 to 13.25
No. 1 railroad wrought scrap	14.00 to 14.75
No. 1 R. R. and mch. cast scrap	13.50 to 14.00
Old steel axles	16.50 to 17.25
Iron axles	21.00 to 22.00
Car wheels	12.50 to 13.00
Railroad malleable, scrap	11.50 to 12.25
Wr'ght iron and soft steel turn.	8.00 to 8.50
Cast iron borings	7.00 to 7.50
Low phosphorus steel scrap	15.75 to 16.00
Old iron rail	15.00 to 15.50
Tank iron	10.00 to 10.25
Boiler plate, sheared	13.75 to 14.25
Pipe and tank	9.50 to 10.00
Stove plate	9.75 to 10.00
Sheet iron	7.00 to 7.50
Locomotive grate bars	11.00 to 11.25

ST. LOUIS

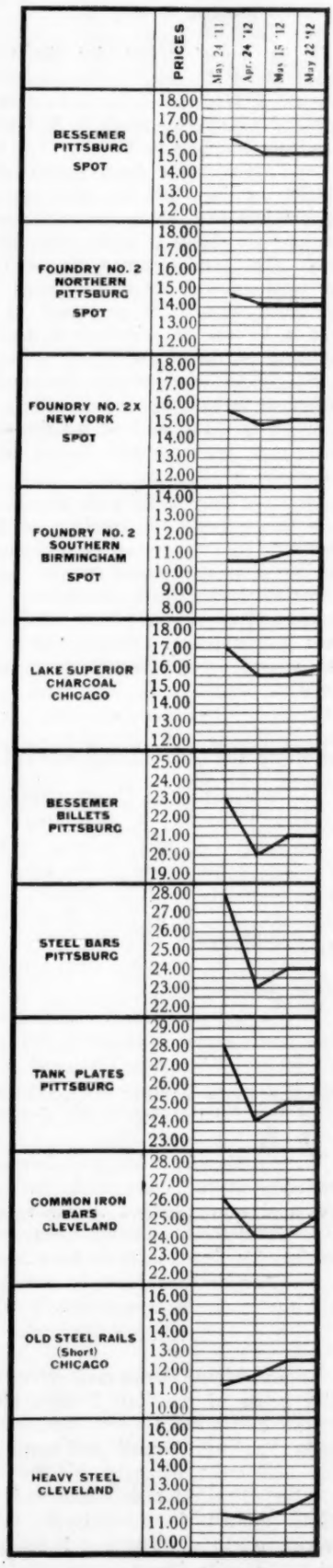
Fair Basic Inquiry is Put Out

Office of THE IRON TRADE REVIEW, St. Louis, May 21.

Pig Iron.—One of the largest iron and steel concerns in the St. Louis territory is in the market for 10,000 tons of southern basic, and another large steel company, with plants on the east side, which does its buying in Chicago, is asking for prices on 10,000 to 20,000 tons of basic. Other inquiries are limited to small lots, but the tonnage placed within the last few days has been fairly good. While some business has been done at $11.50 for southern No. 2 for third quarter, the prevailing price for that delivery is $11 to $11.25, with $11.50 asked for fourth quarter shipment. Northern iron continues to rule at $13 to $13.25, Ironton. Prices on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$15.25 to 15.75
Southern No. 2	14.75 to 15.25

PRICE CHART



Southern No. 3 ..... 14.25 to 14.75
Southern No. 4 ..... 13.75 to 14.25

Coke.—Inquiry is quite lively, but orders have been for small amounts and generally for prompt shipment. Perhaps the largest inquiry in the market today is for 300 tons of Connellsville foundry. Quotations remain as follows:

We quote 72-hour Connellsville foundry grades, $2.50 to $2.65 for second quarter of 1912; 72-hour foundry, $2.25 to $2.50 on tracks and $2.75 to $2.85 for immediate delivery; 48-hour Connellsville furnace, $2 to $2.25; best 72-hour Virginia foundry, $2.50 to $2.75; 48-hour Virginia furnace, $2 to $2.25. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—Inquiries and orders for reinforcing material are coming in quite lively on account of the activity in building in St. Louis and its vicinity. The Missouri, Kansas & Texas railroad is asking for prices on 200 tons of bridge material. Unfinished steel bars are quoted at 1.20c, Pittsburgh, and plates at 1.25c, Pittsburgh, and specifications have been quite good. Bar iron is held at 1.25c, St. Louis.

Old Material.—Business is quiet and prices that consumers are willing to pay, f. o. b. St. Louis, remain as follows:

Gross Tons.

Old car wheels	$13.50 to 14.25
Old iron rails	15.25 to 15.50
Re-rolling rails (5 ft. and over)	13.25 to 13.75
Old steel rails (3 ft. and under)	12.25 to 13.25
Light section relayers (45 lb. and under) subject to inspec.	21.50 to 22.50
Re-laying rails, subject to inspec.	22.50 to 23.25
Frogs, switches and guards	10.50 to 11.25
Heavy melting steel	11.50 to 12.25
Shoveling steel	10.75 to 11.25

Net Tons.

No. 1 railroad wrought	$11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Arch bars and transoms	14.25 to 14.50
Knuckles, couplers and springs	10.50 to 11.00
Shafting	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	16.00 to 16.50
Locomotive tires	11.50 to 12.00
No. 1 country wrought	9.25 to 9.75
Pipe and flues	8.50 to 9.00
Tank iron and cut boilers	7.50 to 8.00
No. 1 cut busheling	9.25 to 9.75
No. 2 cut busheling	6.25 to 6.75
Cast and mixed borings	6.25 to 6.50
Machine shop turnings	7.00 to 7.25
Railroad malleable	10.50 to 11.00
Agricultural, malleable	9.50 to 10.00
Stove plates	9.50 to 10.00
Angle splice bars (iron)	11.25 to 12.00
Angle splice bars (steel)	9.50 to 10.00

The East St. Louis price is 30 cents a ton higher.

BRITISH MARKET

Threatened Failure of Minimum Wage Cut

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., May 11.

Pig Iron.—In all the iron and steel industries brisk demand continues, while the situation with regard to raw material, and particularly pig iron, shows scarcely any relief. The output of pig iron in all districts is still below the average, as the furnaces recently restarted are not yet working satisfactorily. In the Cleveland district, this restricted production is reflected by the continued depletion of the stocks in store, which has gone on during the past week at the rate of over 2,000 tons a day. At the same time shipments are steadily increasing. The result of these conditions is shown in a decided increase in the prices of Cleveland pig irons. At the opening of Friday's market business was done in No. 3, Cleveland B. M. B. pig iron, for prompt, f. o. b. delivery, at 54s 3d ($13.05) per ton, but later in the day makers put up their quotations to 54s 6d ($13.10).

Finished Material.—The resources of all the steel manufacturers are most severely taxed, and subject to possible labor troubles, there is believed to be 12 months' good trade ahead. Almost every device is being employed, especially in the Sheffield district, to obtain a maximum output in order to clear off arrears, and make way for the forward business which seems to be coming in like a flood. Finished steel has been advanced 10s and 20s per ton, according to quality. Bessemer acid billets are now £7 5s, Siemens acid billet to £7 10s to £7 15s, and basic steel billets £6 5s to £6 15s. In spite of the opening afforded by the recent strike to importers of foreign billets, a very small tonnage is on offer from the Continent. For ship building materials the demand is perhaps greatest of all.

The trade of the country is again threatened with serious labor troubles. There is a grave danger of the minimum wage act, passed in order to terminate the coal strike, proving a failure. Lord St. Alwyn was chosen as the independent chairman of the district boards in South Wales. Failing an agreement by the parties, the fixing of the minimum rate was left to this board, which has given a decision placing the minimum below what is now the average wage.

METAL MARKETS

Heavy Straits Shipments Unsettle Market

New York

May 21.

Tin.—Rumors of greatly increased shipments of pig tin from the Straits the latter half of May had an unsettling effect on the London market for the metal. It is reported there that total shipments for this month will approximate 5,500 tons. That figure exceeds the amount shipped during May, 1911, by about 1,200 tons. In addition to this anticipated increase in visible supplies, the Banca auction will be held this month, and will release 2,700 tons. Although consumption continues large both in Europe and this country, if the above predicted increase occurs deliveries to consuming points will probably not offset the amount of fresh supplies by between 1,500 and 2,000 tons. The price of spot standard tin rose to £213 15s in the London market and to 46.75c in the local market toward the end of last week. Following the high estimates of eastern shipments, prices have declined to £208 and 45.-75c in the respective markets. During the past few days there has been some activity between dealers and traders, but only a moderate demand has come from domestic consumers. Arrivals of tin since May 1, aggregate 1,761 tons. There are 2,480 tons afloat, of which between 1,500 and 2,000 tons are due to arrive this month.

Copper.—The heavy buying by domestic and foreign interests that developed last week, was continued up to yesterday, and advanced the price of electrolytic to 16.50c delivered in the Naugatuck Valley, and 16.37½c cash, New York. Some estimates of the amount of metal sold during the past week are as high as 30,000,000 pounds. It is said, however, that most of the business was done previous to the last advance of ¼c. Lake copper was also in good demand and has been advanced to 16.50c to 16.-62½c. Casting grades are quoted at from 16.12½c to 16.25c. Exports since May 1, are 16,762 tons.

Lead.—Although prices are slightly firmer the lead market has not yet caught up with other metals in activity, or increase in value. Independents are again a shade above the leading seller, at 4.22½c to 4.25c in New York. The American Smelting & Refining Co.'s price continues unchanged at 4.20c in New York.

Spelter.—There has been considerable activity the past week. Practically all the business done however, was for future delivery, the metal being almost unavailable for immediate shipment. The market for the latter position is nominally 7c in New York. Early June is quoted at 6.85c and later months at from 6.75c to 6.65c up to September.

Antimony. — The antimony market is steady at unchanged prices, Cookson's is 8c; Hallett's is 7.75c, and Hungarian is 7c.

Chicago

May 20.

New Metals.—The demand for new metals has been active recently. Copper is appreciably firmer, current quotations being 16⅜c, Chicago, for prime lake brands. Tin continues to show a tendency to advance and consumers are curtailing their purchases wherever possible. Lead and spelter have shown considerable fluctuation.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 16¼c; casting, 16⅛c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 6.75c; lead, desilverized, 4.15c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, 8.65c, f. o. b. La Salle, in car lots of 600-pound casks; pig tin 47c; Cookson's antimony, 8½c; other grades, 7½c to 8c.

Old Metals.—The prices on old copper, brass, zinc, etc., have advanced largely on account of the higher price for new copper and the firmness in the spelter market. The advances amount to approximately ⅜c per pound. The character of the buying in this market is unchanged.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 14¾c; copper bottoms, 13¼c; heavy cut crucible copper, 14¾c; heavy red brass, 12½c; heavy yellow brass, 10c; No. 1 red brass borings, 11c; No. 1 yellow brass borings, 9c; brass clippings, 9¼c; lead pipe, 3½c; zinc scrap, 5½c; tea lead, 4c; No. 1 aluminum, 12½c; No. 1 pewter, 28c; block tin pipe, 41c; tin foil, 35c; linotype dross, 3¼c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; prime slab zinc dross, $90 ton.

CUT IN TWO

Were Earnings of Westinghouse Electric & Mfg. Co.

In its annual report for the year ended March 31, last, the Westinghouse Electric & Mfg. Co. shows a total business of $34,196,446, which is $3,922,866 less than was done in 1910-11. The net income available for dividends was $2,-444,099, or just half the earnings of the previous year. More favorable comparisons are shown if made with earlier years. The surplus earned was equivalent to the full 7 per cent dividend on the small amount of preferred stock, with a balance of slightly less than 6 per cent on the $36,700,287 of common stock. In the previous year the surplus amounted to 12.3 per cent on the common shares. The outlook for the current year is considered to be very favorable.

President Guy E. Tripp, in his report, says the decrease in earnings is due partly to an actual reduction of output, but to a greater extent to the lower prices obtained. He says there were no unusual developments during the last year in connection with the affairs of the several foreign Westinghouse companies.

Changes at Pratt & Letchworth Co.

The resignation of C. W. Sherman, general manager of the Pratt & Letchworth Co., was accepted at the meeting of the board of directors of that company, held in Buffalo, last Saturday, and is to take effect June 1. Mr. Sherman retires to organize a company to operate a steel foundry at Hamilton, Ont.

The board elected J. C. Bradley, for many years connected with the Pratt & Letchworth Co., and who has been a director of that company for the last ten years, to the position of president.

W. C. Houck, who was formerly secretary of the Pratt & Letchworth Co., and now engaged in other business in Buffalo, although always retaining his interest, has been made a member of the board of directors and the executive committee.

Engine House Destroyed.—The engine house of the blast furnace plant of the E. G. Brooke Iron Co., Birdsboro, Pa., was burned and some of the equipment damaged by the explosion of an oil tank which had become ignited from a torch in a workman's hand. The loss is estimated to be quite heavy.

Pools Collapse as Carnegie Steel Co. Withdraws

Members Sometimes Slept at Meetings and Did Not Take Price Agreements Seriously—Roberts Tells of Absorption of American Bridge Co.

On the resumption of the hearings in the Steel Corporation dissociation suit in New York, Tuesday morning, the first witness was John C. Langan, of Brooklyn, a real estate operator, who was the private secretary to W. C. Temple, of Pittsburgh, from July, 1902, to December, 1906. Mr. Temple, the witness stated, was commissioner of the structural steel, steel plate and steel shafting associations. Of the structural steel association, said the witness, the following were members: The Carnegie Steel Co., the Jones & Laughlin Steel Co., Illinois Steel Co., the Phoenix Iron Works, Pencoyd Iron Works, Passaic Rolling Mill, A. & P. Roberts Co., and later the Lackawanna and Cambria Steel companies. At the meetings of this association, Col. H. P. Bope, Willis L. King, A. C. Fairchild, George A. White and others represented their respective companies. This association was operated, like the wire and horseshoe pools, on the basis of allotment. When any company exceeded its allotments in any one month, it was forced to pay in to Willis L. King, treasurer of the association, a forfeiture of $4.00 a ton. This amount was later decreased to $2.00 a ton. The total of these forfeitures was then divided up among those members who had not shipped their full allotments. The various companies comprising the pool sent in their monthly shipment statements to the commissioner, from which the latter compiled his report.

Prices were usually fixed, said Mr. Langan, at the meetings of the representatives of the firms composing the membership of the association. The period of fixed prices continued until some time in 1904, probably the latter part, said Mr. Langan. After that, however, the meetings continued along the same lines. While prices were not fixed, the members would announce the prices at which they would do business. A great many announcements were made at each meeting.

"How long was the price, as determined by the announcements, upheld by the members?" asked Judge Dickinson.

"Sometimes until right after the meeting," said Mr. Langan.

The Plate Pool

The steel plate association, said Mr. Langan, was comprised of the following companies: Carnegie Steel Co., Jones & Laughlin Steel Co., Cambria Steel Co., Worth Bros. Co., Lukens Iron & Steel Co., Central Iron & Steel Co., Illinois Steel Co., Glasgow Iron Co., Lackawanna Steel Co., Crucible Steel Co. of America, American Steel & Wire Co., Otis Steel Co. and the Tidewater Steel Co. The Carnegie Steel Co. was alloted about 42 to 45 per cent of the association's business, to the best of the witness' memory, while the Illinois Steel Co. had about 6 per cent.

The operation of this pool was practically the same as the shape association. After its dissolution in 1904, informal meetings were held and information on prices exchanged.

The steel shafting association consisted of the Union Drawn Steel Co., the Jones & Laughlin Steel Co., the American Steel & Wire Co., the Cumberland Steel Co., the Brightman Mfg. Co., the Pressed Steel Shafting Co., a bridge company in Pittsburgh, the Buffalo Steel Co., the Hill Clutch Co., the Medart Patent Pulley Co. and probably one or two others.

This association was operated in practically the same manner as the two others except that it continued to fix prices until a later period than the close of 1904. After that, there were informal meetings. This association was not as active as the other two and the members did not strictly live up to its terms.

"Some of the members would fall asleep during the meetings, while others used to go out for a drink," said Mr. Langan. The witness said that even though prices were fixed as near as he could remember the members charged their own prices anyway.

In cross-examination by Mr. Reed, the witness stated that dealers and jobbers of the products controlled by the association attended the meetings and seemed to think the association was a good thing for business.

"Why did the structural steel association disband in the latter part of 1904?" asked Mr. Reed.

Gary Broke Up Pools.

"Col. Bope, of the Carnegie Steel Co., stated that Judge Gary had asked him to withdraw from the association. With the Carnegie company's withdrawal, the association disbanded," said Mr. Langan. The plate association ended similarly.

Percival Roberts Jr., of Columbia county, Pa., formerly of A. & P. Roberts Co., which operated the Pencoyd Iron Works, later president of the American Bridge Co., and at present a director and member of the finance committee of the Steel Corporation, was asked about the stock transactions when the American Bridge Co. was taken over by the Steel Corporation Mr. Roberts said he agreed to exchange his Bridge company stock for Corporation stock and to become a director of the Corporation. Mr. Roberts described the taking over of the American Bridge Co. as "simply an exchange of the securities of one corporation for those of another and not a purchase at all."

Mr. Roberts stated that prior to 1900, various associations were formed to fix prices or agree upon some other profit-sharing scheme. These, he stated, were the result of destructive competition and the lowering of prices to near the cost of production. Sometimes these agreements were kept and sometimes they were not.

"Were you present at a meeting of the executive committee of the United States Steel Corporation on May 6 and also one on May 13, 1901, at which was discussed a proposal to combine most of the independent bridge companies into one large company, so that the American Bridge Co. would have only one competitor to deal with?" asked Judge Dickinson on the resumption, in the afternoon, of the examination of Mr. Roberts.

Mr. Roberts recollected these meetings and stated that this proposal was originated by Frank Conger. At these meetings, Judge Gary and Messrs. Schwab, Edenborn, Converse and Roberts were present. The proposition was finally dropped.

"Was there any agreement made at the time by which you were to refrain from again engaging in the bridge building business?"

"There was no such agreement," the witness replied.

"Do you remember any contract by which the Carnegie company agreed not to manufacture any steel viaducts, bridges, station sheds, or any other steel structures, for a period of 10 years, providing that the bridge company purchased not less than 51 per cent of its rolled shapes and not less than 75 per cent of its steel plates,

bars, etc., from the Carnegie company, also providing that the bridge company did two-thirds of such fabricating business in the country?" asked Judge Dickinson.

"There was such a contract between the Carnegie Steel Co. and the American Bridge Co.," said Mr. Roberts.

"What per cent of the country's output of fabricated structures does the American Bridge Co. now control?" asked Mr. Lindabury.

"About 32 per cent," answered Mr Roberts.

In redirect examination by Judge Dickinson the witness was questioned about that part of the contract between the Carnegie Steel and the American Bridge companies in which it was stipulated that the latter should control two-thirds of the country's structural business. Mr. Roberts stated that the Bridge company never controlled such a large proportion of the business and he referred to that part of the contract as a "law-year's agreement".

The hearings are expected to come to an end in New York about May 31, and will probably be resumed in Pittsburgh the early part of the week following.

ARGUMENTS HEARD

On Freight Rates on Ore From Western Points.

Arguments were heard last week by the Interstate Commerce Commission on the complaint against freight rates on iron ore from western points made by the Wharton Steel Co., Wharton, N. J., against the Delaware, Lackawanna & Western, New York Central & Hudson River, New York, Susquehanna & Western railroad companies and the Central Railroad of New Jersey.

Charles M. Johnson, representating the complainant, attacked the rates on the ground that they were unreasonably high and unjustly discriminatory as compared with rates charged for moving iron ore from Buffalo and Port Henry, N. Y. He claimed that on the haul from Ringwood, N. J., to Birdsboro, Pa., a distance of 143 miles, the rate is $1.20 a ton, while from Buffalo to the same point, a distance of 424 miles, the rate is $1.45; also that the rate from Port Henry is $1.65 and the distance 428 miles.

On behalf of the defendants, E. C. Morton stated the charge of $1.45 from Buffalo was a blanket rate to all eastern Pennsylvania furnaces.

TUBE COMPANY

Expected to Employ Two Thousand Men in Two Years.

The Baltimore Tube Co., Baltimore, Md., has been organized with a capital stock of $1,200,000, half common and half preferred, entirely financed, leased a large tract of ground with four substantial buildings, and is now in operation in a small way in southwest Baltimore.

The officers of the company are: President, Herbert A. Wagner, who is vice president of the Consolidated Gas, Electric Light & Power Co.; vice presidents, Norman James and Daniel C. Spruance; secretary and treasurer, John L. Bailey, who is treasurer of the Consolidated Gas, Electric Light & Power Co.; assistant secretary and treasurer, Walter M. Bush; directors, Fred W. Wood, president of the Maryland Steel Co.; Norman James, vice president of the N. W. James Lumber Co.; Herbert A. Wagner, Daniel C. Spruance, Charles E. F. Clark, of New York, vice president of the Pennsylvania Water & Power Co.; Henry M. Keith, New York, vice president of the International Railways of Central America, and Edward S. Hyde, New York, secretary and treasurer of the International Railways of Central America.

The newly organized company will be the first to establish a plant south of New York for drawing seamless brass, copper and steel tubing, and manufacturing condenser tubing. It is said the company is manufacturing an improved type of condenser tube and a new product in the form of flexible brass and steel tubing made from a single piece of metal without joints. This tubing is expected to replace the rubber hose now used for couplings for the air brake and steam heating systems on railway trains. The company will also manufacture manifolds and other copper parts for automobiles by an electrolytic process. The processes are the invention of L. H. Brinkman, of New Jersey. A plant was established in Baltimore last summer and at present there are 60 men at work. It is expected to employ 2,000 men in two years. Half of the financing was done in Baltimore and the other half in New York. The company has leased the old gas plant of the People's Co., in Baltimore, from the Consolidated Electric Light & Power Co.

The Baldwin Locomotive Works has received orders for the following locomotives for the week ending May 4: Five mallet type and four consolidation type, for the Missouri, Oklahoma & Gulf railway; two consolidation type for the Carolina & Northwestern railway; two four-coupled switchers for the Hatden Machinery & Supply Co.; 18 consolidation type and four Mogul type for the St. Louis Southwestern Railway Co.

CAR MARKET

Is More Active—Additional Rail Orders Placed.

New York, May 22. (By wire.)—The Harriman Lines have closed for 30,000 to 40,000 tons of rails additional, new construction bringing their orders placed this year to 70,000 to 80,000 tons. The division among mills has not yet been announced, but it is between corporation and independents. The Tennessee company will roll 18,000 tons for Frisco Lines.

The Illinois Central has distributed 4,000 cars. The car market is beginning to show stir again and a number of new propositions have been brought out during the past week. The Seaboard Air Line, it is now officially confirmed, has placed 1,000 box cars with the Pressed Steel Car Co. and will close this week for 2,000 hoppers and 25 cabooses. The Central of New Jersey is inquiring for 1,000 gondolas. The Baltimore & Ohio's announcement of additional financing is believed to precede a large additional purchase of cars which has been referred to at various times. The Norfolk & Western takes bids this week for 65 coaches.

KEEN INTEREST

Manifested in Coke Contracts—Higher Quotations.

Pittsburgh, May 22. (By wire.)—Negotiations for last half contracts for furnace coke are attracting much keener interest among buyers because several operators have withdrawn prices below $2.50, ovens, even to old customers. Some of the estimates for fourth quarter coke made to customers are around $2.75 and $3.

Basic iron is selling, in lots of a few hundred tons, at $13.25, but the larger tonnage inquiries will unquestionably get a $13 quotation for prompt shipment.

Old machines in the nail mill will be replaced with machines of added capacity and other improvements will be made soon at the plant of the Kokomo Steel & Wire Co. The cost of the improvements will approximate $100,000, it is said.

Contract Obligations in the Steel Business[1]

Fundamental Conditions Suggested for a Uniform Sales Contract—Evils of Present Relations and European Practice

By E. A. S. Clarke

At the meeting of this Institute held on Oct. 14, 1910, Willis L. King, chairman of the committee on contract obligations, presented a carefully prepared paper on this important subject, which was very fully discussed by Chas. M. Schwab, J. A. Topping, Chas. S. Price, H. P. Bope, J. A Farrell and E. J. Buffington. Mr. King's paper and the discussion that followed set forth very clearly the existing situation, together with the disadvantages attending it, as well as the causes which brought about those conditions, and the remedies necessary to correct them. In fact, the whole subject was so well covered that there seems little left to say, except to urge again strongly that the evil be corrected.

For the sake of convenience, however, I shall endeavor to state briefly the trouble, its causes and the necessary remedies:

The average buyer of steel has for some years looked upon his contract as an option, the material to be taken if the prices remained satisfactory, but the entire contract to be repudiated if conditions were not favorable. This custom does not apply to all forms of steel, and not at all to raw materials entering into the manufacture of steel. Contracts covering the sale and purchase of ore, coal, coke, pig iron, and in most cases billets and sheet bars, are practically always strictly carried out.

The same is true in regard to steel rails, though in the case of this commodity the time of delivery is sometimes extended, if the purchaser can show satisfactory cause, into the following season; but cancellations of rail contracts are practically unknown. Evidently, in the case where the buyer regards his contract as a mere option, a situation arises under which the seller has a heavy tonnage of obligations which he may have to meet, but which the buyer will not take unless conditions are favorable to him. The seller, realizing this, and particularly if the market is advancing, deliberately contracts for the sale of more tonnage than it is possible for him to deliver. The result is dissatisfaction on the part of the buyer at not getting proper deliveries, so that he, in turn, contracts with several sellers for a total of far more than he can use, with the idea that out of the combined contracts he will be able to get the deliveries and amounts that he needs. The disadvantages of such a situation to both parties are so evident as to need no further explanation.

As to the causes of this unfortunate situation, the one which in my judgment is chiefly responsible is stated in the discussion by J. A. Farrell, and I quote from his remarks, as follows: "The overwhelming desire of salesmen to do all of the business in their territory. * * * For the purpose of making a good showing in the volume of sales and contracts, buyers, and particularly the large wholesale merchants, have not infrequently been induced, not to say inveigled, into placing contracts, covering as extended a period as possible, for tonnages which they may hope to sell, and in some instances, which they can have no reasonable expectation of being able to sell." Many other reasons for the prevailing tendency to disregard contract obligations were given, but, in the writer's judgment, the above statement of Mr. Farrell covers the fundamental underlying cause.

E. A. S. CLARKE, PRESIDENT LACKAWANNA STEEL CO.

For the correction of these conditions, Mr. Farrell's suggestion that the salesman's remuneration and chance of advancement be made to depend not upon the volume of his sales and contracts, but upon the profit derived from the goods actually delivered to the buyers, is most excellent. Mr. Bope's suggestion of short-time contracts, no guarantee against decline, preventing the buyer from buying more than he requires for use in any given period, and an equal obligation put upon the seller not to sell more than he can deliver within that period if properly carried out, would accomplish most of what is necessary; provided that the sales contract, as suggested by Mr. Price, contain the elements of mutuality and fairness; and particularly, as Mr. Buffington stated, if the seller gives proper heed to his obligations in respect of making deliveries in accordance with his contract.

It seems evident that the sellers of steel are themselves primarily responsible for the condition to which they object, and it seems equally evident that they are the ones to correct it. This they can do only by thoroughly believing that an evil exists which is worth correcting and by co-operating harmoniously to that end.

Following the printing and circulation among the members of the Institute of Mr. King's paper and the discussion of it the committee on contract obligations decided that one of the first steps necessary to a full reform was the adoption of a uniform sales contract—uniform, that is to say, in respect of certain fundamental conditions—and a draft of such a contract form was prepared and discussed. For various reasons no definite action was taken; but the writer, as a member of the committee, has never lost interest in the matter. Following a general discussion of the subject with some of the European manufacturers who attended the meeting of October, 1910, and after again meeting them at the Brussels conference in 1911, he decided to investigate more thoroughly the situation and the customs prevailing among European steel manufacturers. The gentlemen with whom he has corresponded, have replied most fully and frankly to all questions asked, have manifested great interest in the subject and have supplied the writer with valuable data and information.

The net result of the writer's investigation shows that the laxity as regards contract obligations which prevails in this country is practically unknown in Europe, and that many of the remedies suggested for the correction of the evil here are in current use abroad. There are in practically every country in Europe certain general sales conditions which vary but slightly between countries and which govern all sales of steel. These fundamental conditions are always stated at the time of making quotations, so that the buyer understands clearly the conditions which will govern the execution of the contract, and there can be no question of some new condition arising after the contract has been signed. These general sales conditions which obtain in Europe seem to the writer eminently fair and reasonable, particularly when stated in advance of signing the sales contract.

Conditions of New Sales Contract

A form of sales contract, uniform as to certain fundamental conditions, seems to the writer essential to the proper enforcement of contract obligations. Some of the fundamental conditions which he suggests should be embodied in such a contract, are as follows:

1.—The material should be sold for the buyer's use only, and not to be re-sold unless first further manufactured. This would have to be modified in the case of sales to merchants or jobbers.

2.—Stipulations as to quality and variations should be clearly stated. In the writer's judgment, the best way is to sell the material subject to the seller's standard variations for rolling and shearing, but these should be stated in a list to be published by the seller.

3.—Differentials and extras in the way of price should be clearly understood, and the seller should publish a similar list covering these items.

4.—Even if prices are quoted at final destination, contract delivery should be f. o. b. cars at the seller's works, with freight allowed to destination, the delays and risks of transportation being borne by the buyer.

5.—If the prices quoted include a freight charge, the same should be subject to adjustment in case of increase or decrease in the published freight rate.

6.—Terms of payment and character of funds in which payment is to be made should be clearly stated, and the amount and terms of discount, if any, clearly set forth. It should be made clear that freight charges are to be paid in cash by the buyer, and that they are not subject to discount.

7.—It should be clearly stated that shipments and deliveries under the contract are at all times subject to the approval of the seller's credit department, and that in case of doubt arising as to the buyer's responsibility, further shipments may be suspended until satisfactory assurance as to responsibility is given.

8.—Specifications in detail should be furnished in substantially equal monthly quantities not later than the 15th of the month preceding the month in which delivery is desired; all material to which the buyer is entitled under the contract to be specified at least 30 days prior to the expiration of the contract. Buyer's failure to furnish specifications as aforesaid to be treated, at seller's option and without notice to buyer, as a refusal to accept and receive the unspecified portion of the goods.

9.—The seller should promptly acknowledge receipt of specifications and at the same time advise buyer of the date on which it is expected to begin deliveries against such specifications, and the approximate date at which it is expected to complete the same; such deliveries to begin as soon after receipt of specifications as condition of seller's mill and of its previous sales obligations will permit.

Seller's Liability

10.—There should be a clause defining the seller's liability for non-performance, and the following is suggested as fair:—

The seller should not be liable for non-performance of this contract in whole or in part, if such non-performance is the result of fires, strikes, differences with employes, casualties, delays in transportation, shortage of cars or other causes beyond the seller's control; nor shall these exemptions be limited or waived by any other terms of this contract, whether printed or written, but in the event of unavoidable delay due to fires, strikes or other causes beyond the control of the seller, the buyer may, subject to previously obtaining consent of the seller, cancel the portion of the goods not manufactured or in process of manufacture at the time his request to cancel reaches seller's works.

The seller is hereby given the right to have any company in the United States furnish material of the same kind and quality at the same cost to the buyer in whole or part performance of this contract; and it is agreed that shipments and billing of material by or in the name of such company, as well as any payments made to such company therefor, shall be as effective and binding as if made by or to the seller direct.

[1]Presented at the annual meeting of the American Iron and Steel Institute.

11.—The seller's guarantee in regard to defective steel should be clearly stated, and the time and manner in which claims for shortages or other errors, deficiencies or imperfections must be made.

12.—All tests by buyers for physical or chemical requirements and all surface inspection should be made at seller's mills before shipment, and should be final.

13.—There should be a statement that the contract is made and executed in the state in which the seller's works are located, so that in case of dispute, the laws of the state shall govern.

14.—There should be a statement that there are no understandings or agreements, relative to the contract, that are not fully expressed therein, and that no changes shall be made unless reduced to writing and signed by both parties.

Valid and Enforceable Contracts

Contracts drawn to embody the above conditions, particularly if they are made known to the buyer at the time the quotation is made, should leave little chance for dispute, and should be perfectly valid and enforceable; but they can be enforced only if the principal manufacturers of steel believe in so doing and insist upon their enforcement even at the risk of losing a customer. No mere form or set of conditions will make a contract binding unless the conditions are to be enforced, and one of the conditions which must be lived up to most scrupulously by the seller is that covering deliveries and shipments; and the seller must stand willing to be penalized if he does not make the deliveries agreed to, just as he expects to penalize the buyer for breach of any of his covenants. The advantage to the seller of a strict enforcement of contracts is so evident as hardly to require mention; and in the judgment of the writer equal benefits would accrue to the buyer, and both parties would eventually be far better satisfied.

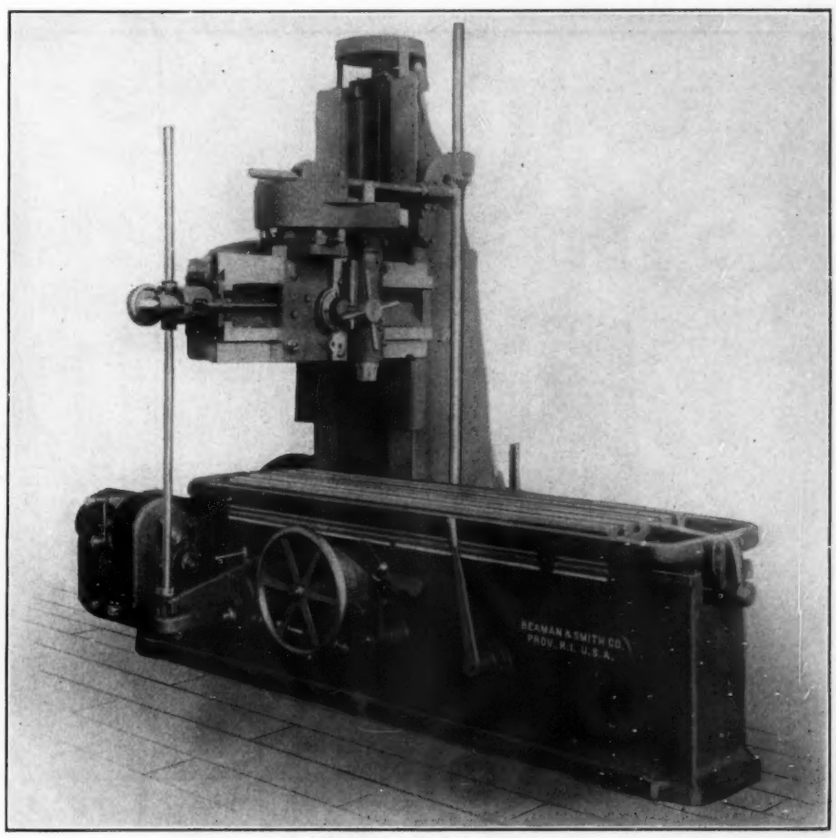
Differentials and Extras

One custom among European steel manufacturers which has struck the writer as being of great value is that of publishing very complete lists of differentials and extras, covering not only sizes and quality but also the quantity of one size or section in an individual specification. From these the buyer can tell just what his material will cost him and is thus enabled to so design his work as to utilize the lowest priced material. The writer believes that proper differential in price, for quantity of one size specified at one time, would prove a satisfactory solution to all concerned, of the question whether large consumers are entitled to a better price than small consumers. Such a basis of differentials is logical because the extra price is charged on account of extra cost. In other words, the buyer, if he requires more expensive service, has to pay correspondingly for it. The writer believes that if a properly prepared schedule of differentials and extras for size, quality and quantity of individual specifications, were in force, the base price of steel could be considerably lower than under present conditions, without reducing the profits of the seller.

In conclusion, the writer suggests that the American Iron and Steel Institute, through its directors, instruct the committee on contract obligations to prepare such a list of differentials and extras, together with a standard form of sales contract, the same to become, when finally approved by its directors, the recommended contract form and list of extras of the Institute. The writer does not believe it to be a function of the Institute to attempt to prescribe any such forms, but believes that, just as the American Railway Engineering Association, whose membership includes practically all the railroads of the country, has a recommended form of specification for steel rails, so the Institute might well have a recommended list of extras and form of sales contract to be adopted and used by such of its members as may feel inclined to do so.

Vertical Spindle Milling Machine

A vertical spindle milling machine adapted for handling a wide variety of work, built by the Beaman & Smith Co., Providence, R. I., is shown in the accompanying illustration. The bed is of the box type and to it is attached an upright which carries the cross-rail. The spindle is carried in a saddle on the overhanging arm and has a horizontal movement. The working surface of the table is 6 feet long and 18 inches wide. It is provided with four T-slots finished from the solid and has two rows of holes for stop pins, while its movement on the bed is 6 feet, 9 inches. The table is provided with a quick power movement varying from 9 to 26½ feet per minute in either direction, as well



BEAMAN & SMITH VERTICAL SPINDLE MILLING MACHINE

as an automatic stop, and the feeds are arranged to maintain the desired rate at any spindle speed. The table is operated by a screw in a revolving bronze nut, the thrust being taken by ball bearings. A trough also entirely surrounds the table. The feeds for the table are positive in either direction and are obtained by means of gearing contained in a feed box. Nine changes of feed are provided ranging from 1 to 8½ inches per minute at any spindle speed.

The crucible steel spindle has a tapered end 3 inches in diameter for face milling cutters and a No. 11 Brown & Sharpe taper hole for cutter shanks and arbors. It has a 6-inch independent adjustment and a horizontal movement of 22 inches on the overhanging arm. The front bearing is 3¼ inches in diameter, 4½ inches long and means are provided to compensate for wear. The rear bearing is 2 9-16 inches in diameter and 4½ inches long. Gearing in the ratios of 3 1-5 and 10½ to 1 provide eight spindle speeds from 14½ to 140 revolutions per minute. The power is transmitted by a 4-inch belt on a four-step cone pulley ranging from 14 to 24 inches in diameter. The cross-rail or overhanging arm has a vertical power movement for adjustment on the upright from 11 to 32 inches per minute. The spindle saddle has a cross feed of 22 inches. The maximum distance from the end of the spindle to the top of the table is 36 inches.

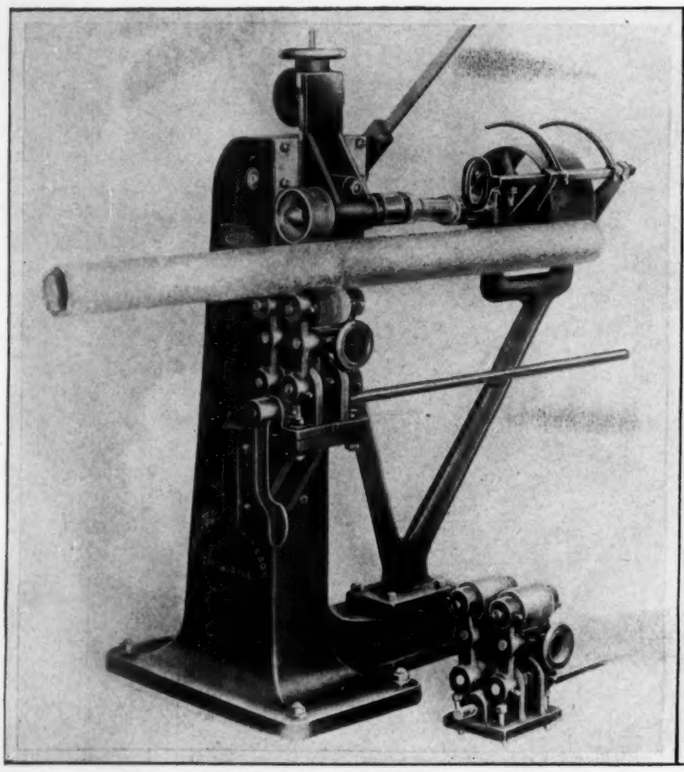


FIG. 1—A COMBINATION TUBE CUTTING AND CLEANING MACHINE

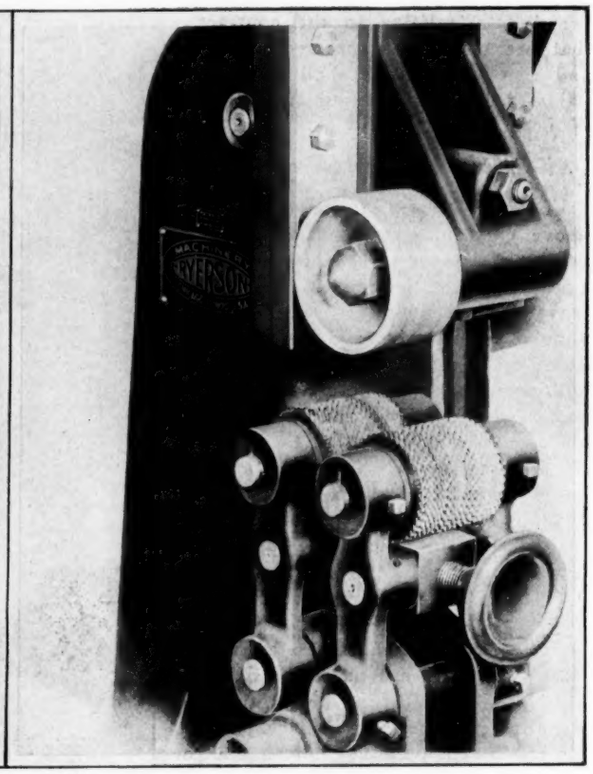


FIG. 2—THE SERRATED TUBE CLEANING ROLLS.

A New Tube Cleaner

Joseph T. Ryerson & Son, Chicago, have recently placed upon the market a new tube-cleaning attachment specially designed to be used in connection with the Matthews tube-cutting machine.

The essential elements of the machine are the friction wheel and the adjustable, twin roller cleaning burrs, which are built-up of hardened, serrated steel discs. The latter are assembled in a unit which is readily interchangeable with the roller tube-support employed when the machine is used for cutting tubes. Hence, only two changes are required to change the cutting machine over to a cleaning machine; namely to substitute the friction wheel for the cutting disc and replace the tube support with the cleaning burrs.

When used for cleaning, the longitudinal travel of the tubes is effected by adjusting the roller support slightly out of square with the direction of travel, the rate of speed being determined by the angle of divergence.

When equipped for cutting tubes this machine is designed to meet the requirements of the general run of shop work, and handles tubes from ⅛ inch to 6 inches in diameter. A universal shaft connects the driving shaft with the main spindle; this does away with all gearing and the consequent noise. The cutting disc is 4½ inches in diameter and is secured on the main spindle which rotates in the vertical sliding head. The feed of the cutting disc is controlled by means of a counterbalanced hand lever.

It is claimed the machine reduces the cost of cleaning to about one-tenth of the hand method and saves the labor cost of carrying the tubes between separate cutting and cleaning machines. One passage through the cleaning burrs finishes the cleaning, the tubes traveling about 10 feet per minute.

The Globe Ball Bearing Co., 50 Church street, New York City, has been appointed American agent for the duplex bearings manufactured by the Societe de Mecanique de Precision, Clichy, France. These bearings are designed to take care of both radial and thrust loads. They are particularly adaptable for use in axles and such other places where exceptional thrusts are likely to occur.

The Nathusius Electric Steel Melting Furnace[1]

A Detailed Description of Its Design and Method of Operation—Various Economical Applications

By Hans Nathusius

In the furnace designed by the author the charge is heated on the surface by several electric arcs, so distributed that the heating is effected as equally as possible. Heating by means of a single arc is absolutely impracticable, because the arc, though very intensive, is a highly localized source of heat. It has been said, with some truth, that the arc in the electric furnace is a necessary evil. It is necessary for heating the slag, but its disadvantage is that its temperature must at least be that required to volatilize carbon (3,000 degrees Cent.), since this is the essential condition of its existence.

Since the maximum desired temperature of the furnace is between 1,900 and 2,000 degrees Cent., it has been the author's endeavor to weaken the intensity of the arc as much as possible, and to reduce the unavoidable over-heating on the surface of the charge to a minimum. In order to effect this he transferred as much as possible of the energy required for a particular furnace to the bath, or rather to the bottom of the bath, and the method of heating thus approximates to that of an induction furnace. By the aid of special means for the distribution of the current, it is possible to transfer a larger amount of energy to the arcs at the surface, or to the bottom electrodes as desired.

Design of Furnace

The furnace is circular in form, as shown in the side elevation and plan views, Figs. 1 and 2. The radiation and conduction losses are thus reduced to a minimum, and the doors allow of a convenient access to the hearth for the performance of the required metallurgical operations, such as drawing off the slag, sampling, or repairs to the bottom. The furnace can be tilted by electric or hydrauiic means. Small furnaces up to 6 tons capacity are tilted on trunnions resting on vertical supports in the same manner as converters, and larger sized furnaces have rockers resting on rollers similar to tilting open-hearth furnaces and mixers.

The characteristic of the furnace, as illustrated, is that it has three carbon electrodes above the surface of the charge which project through the roof into the furnace, and three or a multiple of three bottom electrodes of mild steel rammed in the hearth. The upper as well as the bottom electrodes are arranged in a regular triangle. No regulating devices or other electrical apparatus, such as transformers or motors, are attached to the furnace itself, but these are installed in a separate room behind the furnace.

The furnace is purely a metallurgical apparatus, and all operations may be performed without risk of burning a motor or transformer, or exposing a regulator to dust.

Carbon Electrodes

The carbon electrodes, which require continuous adjustment, are suspended by cables from overhead runways, and are either adjusted electrically or by means of hand wheels from the switchboard. From the room where these are installed a good view of the furnace is possible. The independent suspension of the carbon electrodes comprises a number of advantages; first, it allows of tilting the furnace without having to tilt the electrodes. The breaking up of the electrodes is thus consid-

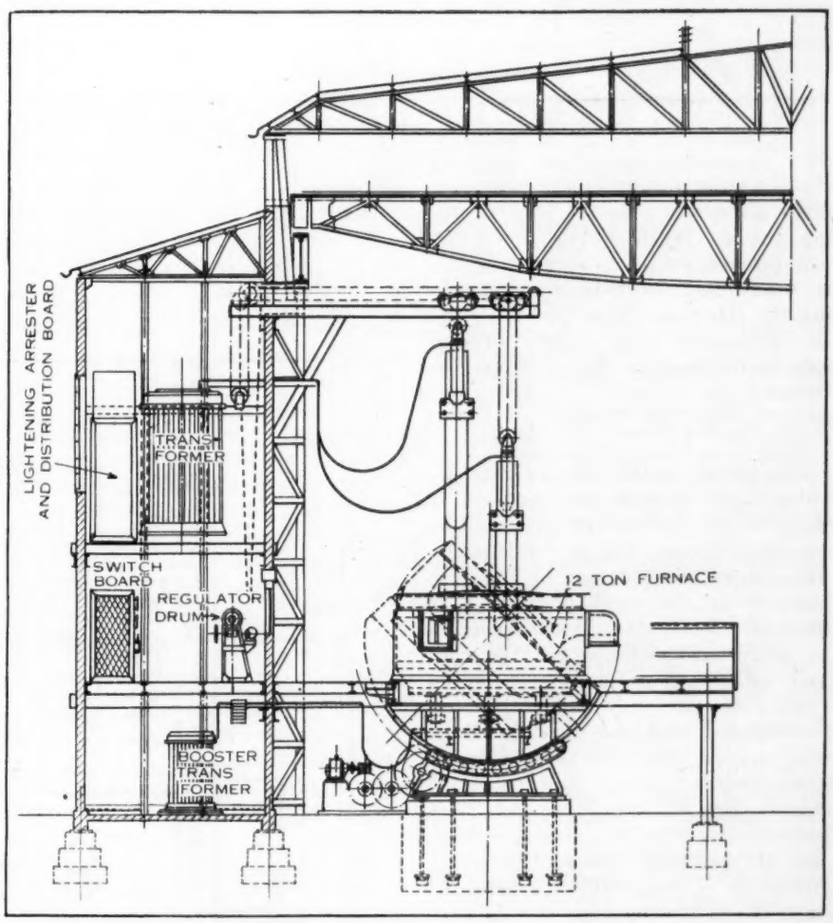


FIG. 1—SIDE ELEVATION OF NATHUSIUS ELECTRIC STEEL MELTING FURNACE

[1]Presented before the Iron and Steel Institute of Great Britain.

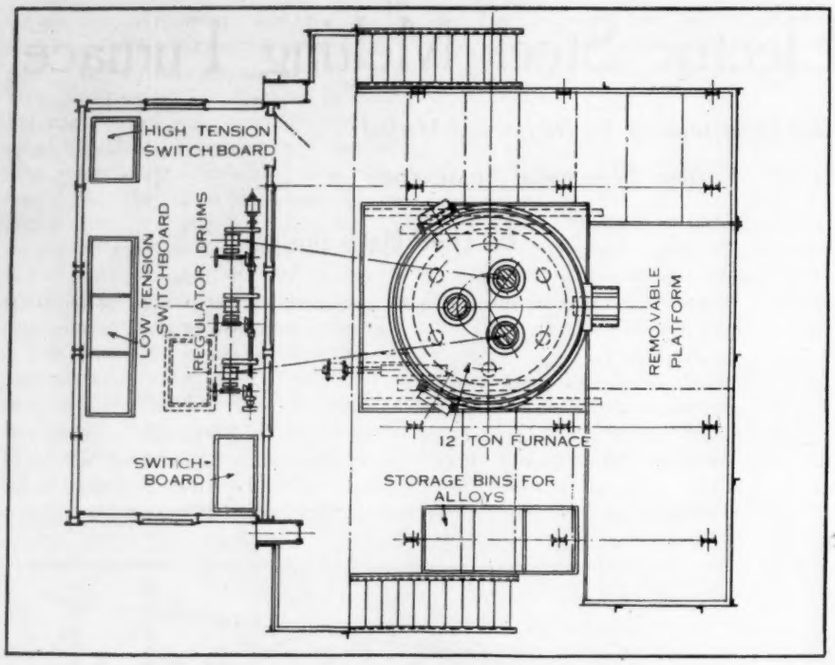


FIG. 2—PLAN VIEW OF THE ELECTRIC FURNACE

erably reduced, as this generally takes place when the furnace is being tipped. When tilting the author's furnace the electrodes are simply drawn up; secondly, by suspending the electrodes from runways they can be readily drawn away to one side by means of a chain and quickly changed.

Furnace Lining and Roof

The lining of the furnace may be either basic or acid, and the roof is built of silica brick. In a basic furnace the bottom and the side walls are lined with dolomite and tar rammed in the usual way. It is a good practice to lay a few courses of magnesite bricks where the roof and side walls meet. The required repairs to the side walls when renewing the roof can then be made very quickly. In the furnace under consideration, owing to the good distribution of the arcs and their reduced intensity, the local overheating of the surface is not so great. When it is required to renew the arch the side walls must also in most cases be repaired, as the roof and the sides bind together. Approximately, 100 heats may be obtained under one roof when only cold metal is charged, and nearly double that number when hot metal is charged. The fact of the current flowing through the bottom increases its durability considerably, for it is well known that a thorough burning at high temperature is the best security for a high degree of refractoriness. As the bottom itself is heated to a high temperature it becomes burnt automatically. For the same reason repairs can easily be made, because the dry dolomite mass when thrown on the bottom is immediately burnt on. Any holes retaining puddles of liquid metal, which might prevent the burning of dolomite, are emptied to the last drop by tipping the furnace to a sufficiently steep angle. Slight repairs to the furnace can conveniently be made during the interval between two charges. Heavy repairs to the bottom are never required.

Electric Current Employed

The current employed is three-phase, alternating, of any convenient frequency. This kind of current is the most convenient for metallurgical work, and in its application economical as well as electrical and thermo-technical advantages are involved. A three-phase current of any frequency may be used. Even in the case of melting down cold charges it is not required to install a motor-generator or a separate generator. The furnace can be connected direct to a step-down oil-transformer, which reduces the voltage of the mains to that of the furnace. Different systems of connection are employed according to the particular requirements of the furnace. The simplest and most useful connection when working with fluid charges is shown in Fig. 3. It will be noted that there are three

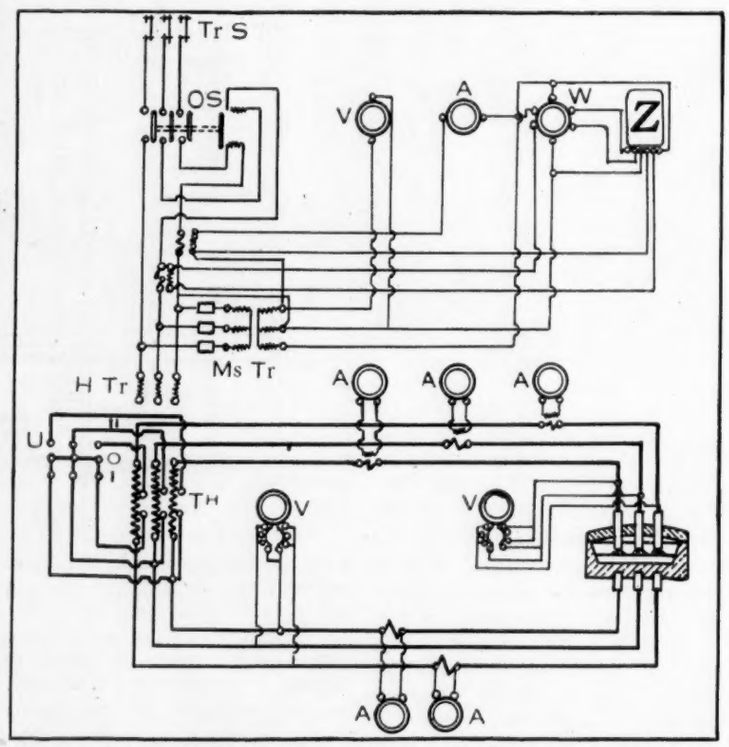


FIG. 3—WIRING DIAGRAM OF FURNACES, ARRANGED FOR WORKING WITH HIGH-TENSION ALTERNATING CURRENT, AND TRANSFORMER WITHOUT NEUTRAL

Switch in position O, zero point in bath; switch in position I, zero point in transformer, with low-tension in hearth electrodes; switch in position II, zero point in transformer, with high tension in hearth electrodes; Z, meter; V, switch; A, amperemeter; V, voltmeter; W, wattmeter; Th, main transformer; Tr S, main transformer; O. S., oil switch; Ms. Tr., measuring transformer; H. Tr., booster transformer.

surface carbon electrodes which are connected to the outer terminals of the secondary windings of the furnace transformer, and three bottom electrodes connected to the three inner terminals of the secondary coil. The three inner terminals of the transformer are obtained by separating the windings at the neutral point where the three secondary windings of an ordinary three-phase transformer are connected. By this means the neutral zone—if it is permissible for the sake of a clearer understanding thus to represent the electric conditions—is transferred to the bath itself, and the current must gravitate from all points of supply toward this neutral zone. In other words, the current, though supplied from a single source only, is forced to flow not only between the upper and bottom electrodes, but also between any upper electrode and any bottom electrode. It is thus possible, with a single source of current, to heat the charge in all parts, provided that its resistance is sufficiently high, or that the current is strong enough to produce sufficient heat in the charge when the resistance is low.

Current in Bottom Electrodes

Experts have expressed doubt as to whether any current flows through the bottom electrodes or even between the bottom electrodes of this furnace. In Fig. 4, in which (in two phases) the course of the current, flowing from the outer terminal, 1, of the secondary winding of phase I, is indicated by arrows and numbers, it may clearly be seen that it is impossible for the current to return to the starting point if it passes only between the surface electrodes. Hence, with this connection, no closed circuit can be established through the surface electrodes only. Since the neutral point is disconnected and transferred to the bath, a circuit can only be established when an equalizing current flows through the bottom electrodes as well as through the upper electrodes toward the neutral zone in the bath. It might be said that the currents are only flowing between the surface electrodes and the bottom electrodes, without also flowing between the individual surface electrodes and the individual bottom electrodes. This is, however, impossible, as the current must flow between two points, between which there is potential gradient and a conductive connection. Since there is a fall of potential between any two electrodes, and since the electrodes are all mutually in conductive connection through the metal bath, there must be a flow of electricity between the upper electrodes and also between the bottom electrodes. To obtain a clear conception of the electric conditions, it will be well to consider the various resistances and tensions in the furnace.

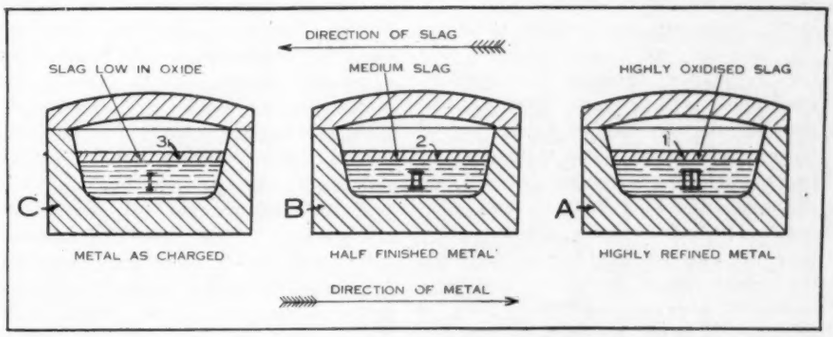


FIG. 5—COMBINATION OF A HEATED MIXER, OPEN-HEATH AND ARC-RESISTANCE FURNACES

In a 5-ton Nathusius furnace the tensions are under normal conditions, as follows:

	Volts.
Between the upper electrodes	110
Between the lower electrodes	10
Between the upper and lower electrodes	61

The resistances are:

A.—Between the upper electrodes—
1.—Resistances of two air spaces.
2.—Resistances of two layers of slag.
3.—Resistance of the bath or charge.
4.—Contact resistance between slag and metal bath.

B.—Resistance between the bottom electrodes—
I.—Covered bottom electrodes:
1.—Resistance between two layers of hearth material.
2.—Resistance of the bath or charge.
3.—Contact resistance between bottom electrode and hearth material.
4.—Contact resistance between hearth material and bath.
II.—Exposed bottom electrodes:
1.—Resistance of the metal bath or charge.
2.—Contact resistance between bottom electrode and metal bath.

C.—Resistance between a surface electrode and a bottom electrode—
I.—With covered electrodes:
1.—Resistance of one air space.
2.—Resistance of one layer of slag.
3.—Resistance of the metal bath.
4.—Resistance of the hearth material.
5.—Contact resistance between slag and metal bath.
6.—Contact resistance between metal bath, or charge, and hearth.
7.—Contact resistance between hearth material and bottom electrode.
II.—Exposed bottom electrodes—
1.—Resistance of one air space.
2.—Resistance of metal bath.
3.—Contact resistance between slag and metal bath.

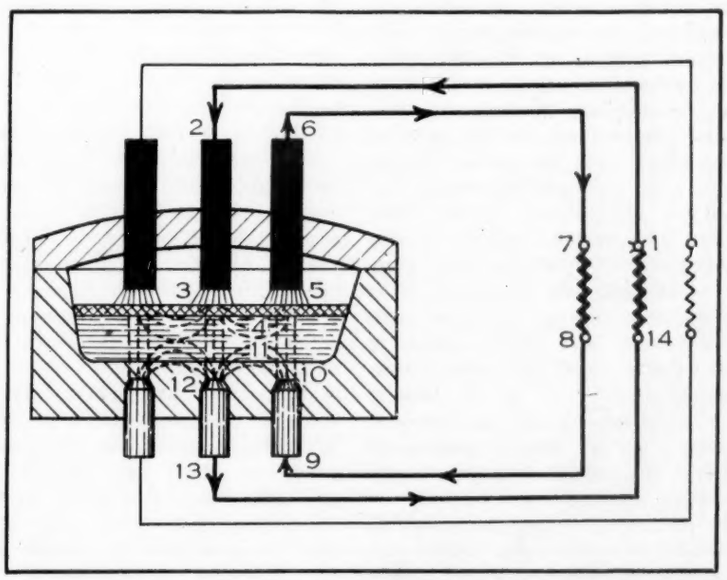


FIG. 4—SECTIONAL VIEW OF FURNACE HEARTH, SHOWING FLOW OF CURRENT

4.—Contact resistance between metal bath and bottom electrode.

The tension between the upper electrodes and between the upper and the bottom electrodes is constant, whereas the tension between the bottom electrodes depends on the resistance between the bottom electrodes. It is now theoretically possible that in the case of covered bottom electrodes, and with a cold hearth at the beginning of a run, the tension at the bottom may also reach 110 volts, under which condition no current could flow between the electrodes. Such a condition, however, does not occur in practice because, as with an open-hearth furnace or converter, a relined electric furnace must be heated before it can be started. The bottom will, therefore, soon become a good conductor; its resistance will diminish gradually as the furnace becomes warmer, and the tension will fall to 10 or 15 volts.

Distribution of Current

It is evident that the distribution of current will be considerably influenced by any alteration of the air spaces, and of the resistance of the layer of slag or of the bottom material. If the charge consists of ore or of scrap iron with large air spaces, then the electric resistance of the charge is quite high enough to generate a sufficient heat in the charge, with the usual current of 3,000 to 4,000 amperes.

A better contact with the charge is obtained with exposed electrodes. These are made of mild steel, and, to prevent their melting, it is necessary to cool the portions outside the furnace with water.

If the charge consists of fluid metal, such as mild steel, then the heat in the bath may be increased by employing bottom electrodes covered with a layer of the hearth material, as shown in Fig. 1. This material will then act as a heating resistance, and the comparatively low resistance of the bath can be increased by taking advantage of contact resistance, hysteresis, eddies, or skin effect.

If this increase of resistance does not suffice to produce the necessary heat effect in the charge, then the current flowing between the bottom electrodes may be strengthened by inserting a booster transformer in the circuit of the electrodes. By this means the heat produced by the bottom electrodes may be regulated from zero to any desired maximum, just as the arc heat may be regulated by lifting or lowering the carbon electrodes. By using the booster transformer in connection with a tension regulator the energy delivered at the upper as well as at the lower electrodes can be regulated to any desired degree. The regulation is based on changing the voltage, is independent of the actual resistance of the current, and is effected by the use of a double push-button without disturbing the working of the furnace and without switching the transformer out; it is also independent of the main transformer. The tension regulator is worked by a small auxiliary motor, supplied with energy by a small low-tension three-phase transformer. The circuit of the auxiliary motor is closed by manipulating one or the other push-button, and by means of a worm-gear the motor turns the tension regulator in either direction, whereby the tension of the transformers is either augmented or decreased. On the release of the push-button the motor and the tension regulator stop in the desired position. By means of a contact relay the regulation of the tension may be made automatically. The same operation may, of course, be carried out without the booster transformer. The main transformer must then have an adjustable neutral, whose position may be adjusted so as to increase the supply of energy to the arc-circuit or to the bottom circuit, as required. A connection of this type is shown in Fig. 4.

Flow of Current

The electric current can thus be compelled to flow through the bottom lining and the bath or charge, as well as through the slag, and a comparatively large resistance is brought into the electric circuit. The resistance acts as an electric buffer by diminishing the unavoidable jumps in the arc-current, and thus enables the furnace to be worked either direct from the supply mains, if 110 volts is available, or on the circuit of an ordinary static transformer. The installation of an expensive motor generator and complicated choking-coils are saved. The furnaces which have been in continuous work for many years at Friedenshutte bear out these statements. Both the 5-6-ton furnace and the 2-3-ton furnace are connected direct to the supply mains, and have never caused trouble at the generating station.

The question is now, how can an arc-resistance furnace be economically applied in metallurgy? To give a general answer is of course impossible, as it depends entirely on individual or local conditions as to how the electric furnace can be applied to the best advantage.

Taking the case of large blast furnaces and steel works where there is available blast furnace gas, and therefore also comparatively cheap current and liquid steel either from a converter or an open-hearth furnace, and where the required grades of steel are not tool steel, but ordinary steel such as hard material for rails, structural steel, projectiles, or soft material for tubes, plates, hydrogen flasks, etc., in large quantities, an electric furnace of the same capacity as the converters or the open-hearth furnaces is the most suitable, as undivided and partially refined charges can then be used. Whether this is possible depends upon whether there is a sufficiently good market for the grade of steel to be produced in the electric furnace. At Friedenshutte, however, a 5-6-ton furnace had to suffice, and this was in continuous work for more than two years in combination with basic steel works. The converters there have a capacity of 12 to 15 tons, of which 5 to 6 tons are charged into the electric furnace, and the remainder is cast into ingots.

Application of Electric Furnace

Whether it would not be possible, under certain circumstances, to work the electric furnace economically in direct connection with the blast furnace or mixer and thus dispense with the converter or the open-hearth furnace altogether, is a question which now arises. In the present state of the electric furnace the author is of the opinion that such a step would be premature.

In large metallurgical works cheap producer coal is generally available. In such cases gas-firing is always a cheaper heating agent than the electric current, even when the latter is generated by blast furnace gas engines. In working up direct metal in an electric furnace by a process similar to the ore process in the open-hearth furnace, the refining would take too long a time, on account of the large quantities of ore and slag which would be required in the neutral atmosphere. The control of the large quantity of slag by heating from above with arcs would no doubt be a most difficult problem, and the refining would be indefinitely prolonged. Even with the cheapest possible power supply the cost of transformation would unquestionably be higher than that

of heating an ordinary tilting open-hearth furnace.

The author is of opinion that the conversion of pig iron by electric means may economically be performed in a heated mixer or tilting open-hearth furnace. When an open-hearth furnace is charged with hot iron either direct from the blast furnace or from a hot mixer it is a well-known disadvantage that the whole bath must be kept unnecessarily hot for a long time after adding the cold slag additions before an energetic reaction can take place between the metal and the still unfused slag.

The slag additions might, however, with advantage be melted in a separate furnace, and for this purpose the electric furnace, and particularly the combined arc-resistance furnace, is better suited than any other because of the high temperature attainable and the high resistance of the charge. The fluid slag of the proper composition can then be charged direct onto the metal bath. A violent reaction and disturbance will then take place in the bath, and the refining will be completed in a very short time. In large steel works, with a row of open-hearth furnaces at work and where the demand for fluid slag is continuous, the electric furnace may be arranged as a kind of slag-mixer, which can always deliver slag capable of reaction. This method might perhaps be usefully applied in the Talbot, Bertrand-Thiel, or Hoesch processes.

In any case, the time of the refining process would be considerably shortened, while it is evident that the two molten masses can react more rapidly on each other. The reaction is also certain to be more complete than when the slag is charged cold. Under these conditions it may become possible to convert direct metal into mild steel in an electric furnace, assuming the electric energy is generated by means of blast furnace gas.

New Combination Furnaces

The same method may also be used with advantage in combination with a heated mixer and a tilting open-hearth furnace. A third furnace—an arc-resistance furnace—may be added with advantage. Such a combination of furnaces is shown in Fig. 5. It will be seen that there are three furnaces. Furnace *C* represents the hot mixer, *B* the tilting open-hearth furnace, and *A* the arc-resistance furnace.

The three furnaces are intended to work together in such a manner that furnace *A* contains steel which has undergone a preliminary refining in the two furnaces, *C* and *B*. For the removal of the remainder of the impurities the hearth is charged with a highly oxidic slag.

Furnace *B* contains pig iron which has already been partially refined in a mixer. The further refining is effected by slag, *2*, now lower in oxygen, from furnace *A*.

When the reaction is finished in furnace *B*, the metal, the refinement of which is now fairly advanced, is charged into furnace *A*, while the pig iron bath is treated in furnace *C* with slag *3*, now comparatively low in oxygen. The slag in furnace *C* is then poured off, and is a most valuable one if the pig iron used is phosphoric. At the finish the slag consists chiefly of lime, silicic acid and phosphoric acid.

This method possesses many advantages. First, the phosphorus contained in the pig iron, and valuable in the slag, is not lost. Secondly, all the iron in the slag is reduced, and the yield can thus be increased. Third, very little or no worthless slag need be produced. Lastly the refining of the metal can be carried practically to perfection.

Melting Ferro-Alloys

For melting down ferro-alloys electric furnaces may also prove highly useful in large iron and steel works. For this purpose the arc-resistance furnace has special advantages. In order to melt down the expensive alloys quickly and without waste or evaporation losses the heating must be as uniform as possible—conditions which can be realized fully with an arc-resistance furnace. The West German Thomasphosphate Works have a method of melting down and working these ferro-alloys in which the material such as ferro-manganese, is to some extent overheated, is kept molten for some time in a mixer under the one slag, and is overheated somewhat without loss of manganese through burning or evaporation.

This process has been used for more than a year at Friedenshutte, in Upper Silesia, using an arc-resistance furnace of 2 to 3 tons. The furnace is in continuous operation, and is employed to melt down ferro-manganese for use in the basic Bessemer converter. The gain obtained by this process amounts generally to 0.35 shilling net per ton of steel, and has at times risen to over 0.4 shilling. It is based on the saving of ferro-manganese, which amounts to about 30 per cent of the former consumption when using cold ferro-manganese. The saving is effected by the taking up of all the molten ferro-manganese into the bath, and the losses in the slag are eliminated. The molten ferro-manganese reacts much more vigorously, and a smaller quantity is therefore required to produce the same reducing effect as a larger quantity of cold ferro-manganese. Lastly, ferro-manganese which has crumbled to powder through storage for a long time may be used without disadvantage, whereas formerly it was considered valueless.

Cost of Melting Ferro-Manganese

The cost of the former method of heating the ferro-manganese in a reverberatory furnace was 4s 2d per ton, while the present melting-down process in an electric furnace is 19s 1d. By saving 30 per cent on the former annual consumption of 3,300 tons of ferro-manganese, the gross saving amounts to £8,208 15s. This is a considerable saving in less than one year, due to the introduction of the electric furnace.

But even if the costs of current, ferro-manganese and other items were such that there would be no net saving, it would nevertheless be of advantage to erect an electric furnace for the process. By the use of molten and somewhat overheated ferro-manganese important improvements are obtained in the quality of steel, and the working is facilitated.

The speed of diffusion with molten and slightly overheated ferro-manganese is of course much greater than that of cold ferro-manganese, the reason being that the reactive capacity of the molten ferro-manganese is much greater, and the deoxidation of the steel is consequently much more thorough. This is proved by the fact that overblown charges can easily be remedied with molten ferro-manganese. Further, material containing 0.25 to 0.3 per cent of manganese can be easily rolled without cracking when the charge has been reduced by molten ferro-manganese, while the material from similar charges reduced with cold ferro-manganese containing up to 0.3 to 0.4 per cent have broken in the rolling-mill.

Further—what is very important in the manufacture of rails—the portion of the molten ferro-manganese which is required to alloy with the steel distributes itself much more regularly in the iron, as the alloying capacity of the molten ferro-man-

ganese is much greater than that of the cold ferro-manganese. The segregation of the manganese, which otherwise easily occurs, is thus eliminated. Also the reducing back of phosphorus from the slag into the bath when cold ferro-manganese is used, is avoided. The molten ferro-manganese does not come into contact at all with the slag of the steel charge, because it is poured straight into the clean stream of metal while the converter is being poured. The result is that the desired chemical composition of the final product is obtained with much greater certainty and spoiled charges are avoided.

Since the adoption of the molten ferro-manganese process at Friedenshutte, the analysis of the converter charges has shown a much greater uniformity.

Among the basic steel works in Germany which have adopted the new process may be mentioned the Friedenshutte Works and the Hasper Works.

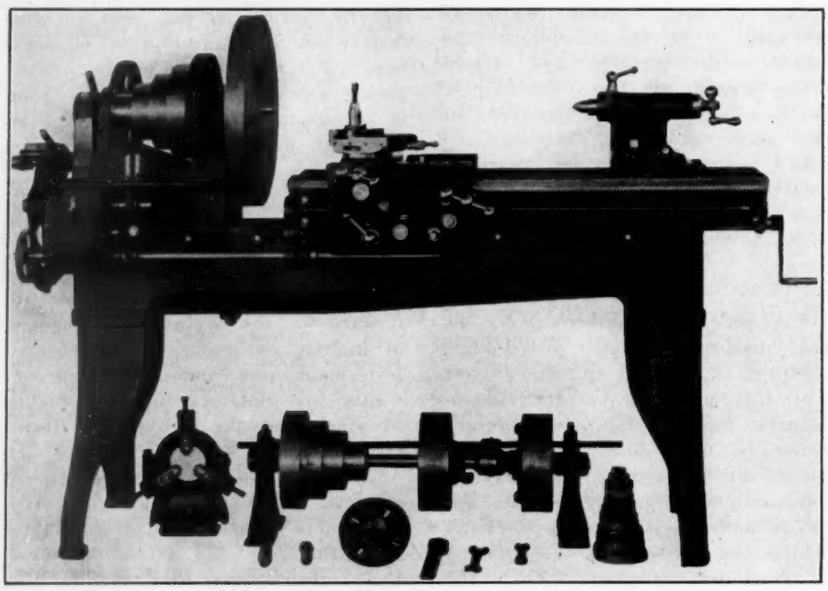
It is obvious that the same process may be applied to the basic open-hearth furnaces or the Talbot process, when a large number of these furnaces are working continuously. The saving in ferro-manganese will probably be as great in these cases, and an improvement in the quality of steel would result. The new method would also prove of great advantage in cases where reduction must take place in the ladle, as in the Talbot process.

Instead of ferro-manganese alone, one might also melt down mixtures of ferro-manganese and ferro-silicon or aluminum, according to requirements. The result is always the same, namely, improved qualities and saving of expensive flux.

The author believes that steel alloys of tungsten, chromium, molybdenum, etc, as used for ordnance and armor plates, may with advantage be melted down in a small electric furnace and charged in a molten condition. This method ought also to be useful in the production of high silicon steels and high manganese steels.

Executive Officers Occupy a 12-Story Building

The executive offices and New York show rooms of the H. W. Johns-Manville Co., manufacturer of asbestos, magnesia and electrical supplies, has been removed to the company's twelve-story building at Madson avenue and Forty-first street. This removal was made on the company's fifty-fourth anniversary. Under the firm name of the J. W. Johns Mfg. Co. this business was conducted at 87 Maiden Lane, previous to May 1, 1897, when the offices were removed to 100 William street. In 1901 the firm name was changed to the H. W. Johns-Manville Co., a consolidation at that time having been effected between the Manville Covering Co. of Milwaukee, and the H. W. Johns-Manville Co. Plants are operated at Brooklyn, Milwaukee, West Milwaukee, Wis., Hartford, Conn., Nashua, N. H., and South Amboy, N. J. Extensive asbestos mines are operated at Danville in the Province of Quebec. In its new quarters the company has the distinction of being one of the few manufacturing concerns which occupies an entire office building.



BARNES 14 TO 24-INCH SLIDING EXTENSION GAP ENGINE LATHE

Barnes Extension Gap Lathe

The 14 to 24-inch sliding extension gap lathe, built by the Barnes Drill Co., Rockford, Ill., shown in the accompanying illustration, is equipped with a spindle 2 15-16 inches in diameter and has capacity for 1½-inch stock. It is provided with six quick change geared feeds, and the sliding top bed is a desirable feature for many jobs, as it permits swinging pieces of larger diameter through the gap and at greater length between centers than is usually possible on an ordinary 14-inch lathe. For extending the gap the top bed is drawn back by a screw and crank at the rear. The tail stock is of the off-set type which permits the compound rest to be set parallel with the bed, and has set-over adjustment for taper work.

The carriage is extended in front and provides a firm support for the turning tool when doing work in the gap up to the limit of its swing. The carriage is fitted to the bed with a long bearing on the V in front and with a flat bearing at the rear and is fed by a splined screw. The carriage also is fitted with T-slots for clamping on work. The six quick change geared feeds, both longitudinal and cross, are as follows: 0.007, 0.011, 0.017, 0.019, 0.030 and 0.049 inch. Either right or left hand feeds can be cut consecutively from 2 to 18, including 11½ pipe thread by twos from 18 to 36, and by fours from 36 to 48. The cone pulley has four steps, respectively, 4, 6, 8 and 10 inches in diameter.

Unveiling of Martin Fox Memorial

The unveiling ceremony of the Martin Fox memorial under the auspices of the International Molders' Union of North America will take place on the afternoon of July 5 at Cincinnati. This ceremony will in all probability be held before a large assemblage, as many of the most prominent men in the labor movement already have signified their intention of being present. Thus far a total of over $3,000 has been subscribed, although a slight additional fund is required to defray the cost of the memorial.

The summer meeting of the American Society of Heating and Ventilating Engineers will be held in Detroit, July 11 and 12.

Some Metallurgical Developments in Steel Practice[1]

Present Day Tendencies of Iron and Steel Manufacture, With a Few Side Lights on Future Possibilities

By John S Unger

The increased demand for steel and the many new purposes to which iron or steel is being applied is shown by the fact that in 1880 the United States produced 54 pounds annually per unit of population; in 1890, 153 pounds; in 1900, 398 pounds; in 1910, 640 pounds, or about twelve times as much as 30 years ago. During the last decade the production and consumption of iron has increased about 60 per cent.

As the consumption per unit increases and the demand extends to those nations who are not now large users of iron, the following conditions will result: New fields of raw material will be found; inferior raw materials must be employed; new processes of manufacture will be developed, capable of dealing with material of poorer quality; and substitutes, either metallic or otherwise, will be offered for iron.

Preliminary Preparation of Raw Material

The gradual exhaustion of lump ores has forced the employment of from 80 to 100 per cent of fine ores in the blast furnace. Such ores are usually inferior physically or metallurgically to lump ores, and require some preliminary preparation. Washing, magnetic separation, pneumatic or other forms of concentration, followed by some form of agglomeration, such as sintering, nodulizing, or briquetting is growing very rapidly and is extending to other fine materials, which were practically waste products in the past. The success attained in treating flue dust, pyritic residues and even iron or steel turnings, has caused metallurgists to demand that these artificial products be made the equal of the better grades of lump ore, in order that their use may be extended beyond the blast furnace to the steel furnace, in which a lump ore is almost a necessity.

Coal capable of producing high grade coke by the older methods is only found in certain localities. In the manufacture of by-product coke, it has been shown that coke of high quality can be made by the proper admixture of coals, some of which alone are unfit for coking purposes. This coke is the equal of the older coke, thus opening up a new source of supply, and in addition the by-products of the process are conserved.

Blast Furnaces

It may be said that it requires about 2 pounds ore, 1 pound coke, ½ pound limestone and 4½ pounds of air, or a total of 8 pounds of material to make 1 pound of iron and ½ pound slag, while 6½ pounds of gaseous products are given off. Fifty-six per cent of the material going into the furnace is air. The average variation between winter and summer season in temperature, pressure and moisture, and moisture content will be as much as 15 to 20 per cent, while the variation in a single day may be 8 per cent. Refrigeration of the air, or dessication of the blast have been tried as remedies, resulting in more regular working of the furnace, more uniform quality of product and a saving of about 50 cents per ton of pig iron produced.

Thin-lined, water-cooled furnaces have been used in Europe for some years. In the United States, four or more furnaces have been in blast for some time with promising results. It appears that the blast furnace of the future may be compared with a cylindrical furnace set in a tank of water reaching from the ground to the top of the furnace. This preservation of constant lines in the interior of a furnace and the use of a lining of the proper thickness to maintain an economical heat balance have shown a reduction in fuel, greater regularity of working and less variation in product.

The use of the waste gases with their attendant savings, for gas engine purposes, is more nearly a mechanical problem and not properly within the scope of this paper. It is sufficient to say that the majority of future installations will be of this kind. Where steam engines are installed, they will be connected with low pressure turbines in order to conserve as much of the available energy as possible.

Within a few years the use of the Bessemer process has declined very rapidly, being supplanted by the basic open-hearth. This was mainly brought about by the scarcity of Bessemer ores and the fact that open-hearth steel is slightly more ductile than Bessemer steel of the same strength. A combination of the two processes, known as the duplex process, is used with success at several plants. All steel-making processes of a purifying character are necessarily oxidizing at some stage of the operation. The making of crucible steel is not one of purification, but depends for its superiority on the use of pure materials and their fusion out of direct contact with the fuel.

Scope of the Electric Furnace

The electric furnace for the manufacture of ferro-alloys is indispensable and has come to stay, while the profitable use of the moderate-sized electric furnace as a substitute for the production of steels of similar qualities to crucible steels, will likely revolutionize the crucible steel industry within a few years. The electric production of pig iron need not be considered at this time. In localities where fuel is scarce and expensive, and ore and power are cheap, it will probably be of importance.

Several steel processes have been brought out, mostly combinations of older methods. In one it is proposed to tap the metal from the blast furnace into a rolling open-hearth furnace, arranged with tuyeres on one side, in which the metal is blown, the slag removed, the furnace moved back to a normal position, where the operation is finished by the open-hearth process.

Open-hearth furnaces with removable ends and roofs are frequently employed. One of the latest modifications is a removable body, which can be used as container or ladle and which is picked up by a crane and carried to the point of casting, thus retaining the heat in the steel and avoiding the use of a ladle. Water-cooled ports, frames and doors are common. The success attending the water-cooling of blast furnaces indicates that within a few years an

[1]Presented at the annual meeting of the American Iron and Steel Institute.

open-hearth furnace equipped with water-cooled ports, sides and roof will be the regular practice.

The use of natural gas as a fuel in favored localities is of great importance to the steel industry. This fuel is free from injurious impurities and of high calorific value. As the fields from which this gas is drawn become exhausted, it is constantly necessary to develop new territory to keep up the supply. Since the supply does not equal the demand, the cost becomes prohibitive and substitutes must be used. The results obtained with fuel oil and tar are very encouraging. At some plants where they are so situated in regard to blast furnaces, open-hearth furnaces and by-product coke ovens the excess blast furnace gas is used to coke the coal, while the higher quality by-product gas is used either alone or with producer gas in the open-hearth or heating furnaces.

Deep cementation and that of lesser degree, called case-hardening, were formerly performed by means of solid carbon or compounds carrying a large percentage of carbonaceous matter. The increased use of superficially-hardened material in gears, roller bearings, cutters, tools, projectiles, etc., has brought out solid compounds of great activity and promoted the use of a number of gases, vapors and mixtures of the same which act very rapidly and at much lower temperature than formerly required in cementation by gases or solids.

Piping and Segregation

Piping and segregation, which are of widely different character, are usually classed together, as they come under the general heading of ingot defects. As a rule they exist together, but in many cases either one or the other will exist in such a limited degree as to be negligible.

Piping may be caused by the shrinkage of the metal during solidification, or it may be due to cavities formed by gases imprisoned in the steel, or to a combination of both causes.

For more than 50 years attempts have been made to reduce piping. These embrace covering the top of the ingot with molten slag or steel, liquid compression, cooling the top of the ingot slowly by a mold in which the top is made up of material which absorbs heat slowly, keeping the metal liquid by gaseous or solid fuel, or the electric arc, casting in a vacuum, the addition of some substance which creates a high temperature at the top, or the addition of elements which absorb the gases. New schemes are brought forward constantly, but an analysis shows them to be modifications of older principles. None has been universally adopted. All fail to accomplish completely the result intended. A few improve the conditions, others are impracticable, while in practically all the cost is prohibitive, except for the more expensive steels.

Some alloy steels pipe very much more than ordinary steels, and even in ordinary steels, it may be said that the shrinkage cavity extends to a greater depth in the ingot of a high carbon steel than in one of low carbon.

Segregation is the separation of the more fusible compounds of the steel, such as the carbides, phosphides and sulphides of iron, to that part of the ingot which is the last to solidify. Elements having the characteristics of true metals, which alloy with iron in all proportions, as nickel or manganese, segregate very little or none at all, while the non-metals, such as carbon, phosphorus and sulphur, are the worst offenders.

Remedies for Segregation

The only real cure for segregation must be one of these three remedies: Instantaneous solidification of the liquid steel, the use of steel containing elements which do not segregate under ordinary conditions of cooling, or the use of pure iron. None of these remedies is practical, but the nearer these conditions are approached the less the segregation.

When all is considered, probably the cheapest and safest method of dealing with piping and segregation in the ordinary ingot of 3 to 4 tons weight is to allow the steel to cool in the regular way, discard 30 per cent from the top and use the remainder. This discard may not always remove all pipe and segregation, but the pipe which remains will close up in working and the segregation will be of such slight extent as not to be injurious.

Those alloys in which iron predominates are considered under this heading. Of the 80 known elements, about one-half have been combined with iron in greater or less proportions. Ordinary commercial steel is an alloy commonly made up of about ten elements. Some of these elements, such as sulphur and phosphorus, have always been considered injurious. Nearly all purifying processes have had the reduction of these two elements as their primary object. Sulphur is sometimes added to low sulphur steel to confer the property of rapid machining, while a certain percentage of phosphorus is of great value in preventing the sticking together of a pack of sheets, or to insure a firmly adhering coat of spelter in galvanizing.

All the elements present or added produce certain beneficial or injurious effects, depending on the amount. Manganese up to 1.25 per cent is a necessity; from this point up to 6 per cent it produces hardness and brittleness, rendering the material unfit for service. When the steel carries about 12 per cent, a slightly magnetic, hard, ductile alloy of great value in the arts is obtained.

Silicon produces soundness, but renders the steel harder. In steel castings rarely more than 0.50 per cent is used, as higher percentages yield a hard casting difficult to machine. A steel containing 1 per cent manganese, 1.75 per cent silicon and 0.50 per cent carbon will show after proper heat treatment an elastic limit of 200,000 pounds and an elongation of 10 per cent. Steel containing about 3 per cent silicon is difficult to forge or roll, but when finished and properly heat-treated will show very valuable magnetic properties, which are indispensable to the electrical engineer. This steel is one of the newer alloy steels.

Carbon varying from traces to 1.50 per cent produces marked physical changes and seems to show the most pronounced effect of any element. Until the advent of alloy steel and even since then, its proportions largely govern the various properties of the entire range of steels.

Nickel Alloys

Nickel alone or with other elements, as chromium or vanadium, improves the strength of steel without materially decreasing the ductility. At least five classes of nickel steels, ranging from 3 to 36 per cent nickel, are important iron alloys. The 36 per cent alloy called Invar, is remarkable in possessing the least expansion or contraction per unit of temperature of any metallic substance.

Vanadium is one of the newer elements to be added to iron. It seems to rank next to carbon in intensity of effect, and is used in small percentages, usually from 0.25 to 0.50 per cent. It aids in raising the elastic limit of the steel to within 70 to 90 per cent of the ultimate strength and improves its resistance to failure under repeatedly applied dynamic stresses.

Tungsten was used by Mushet in the development of self-hardening

tool steel, contributing the property of hardening while cooling in the air. This discovery was the beginning of the great developments made in the tungsten, molybdenum, chromium, high speed tool steels of the present day.

Of the newer elements alloyed with iron might be mentioned boron, titanium, arsenic, antimony, bismuth, copper and manganese. Some of these alloys look very promising.

The use of alloy steels containing other than the regular elements is growing very rapidly. One factor that has contributed to their growth is the great advance made in the automobile industry. Statistics show that over 600,000 tons of alloy steel was made during 1910, or more than three times as much as in 1909.

Heat Treatment

Heat treatment may be defined as the careful heating of steel to a predetermined temperature, followed by a slow or rapid cooling, usually followed by a second heating to a lower temperature than the first then by rapid or slow cooling. The temperatures used and the method of cooling employed vary as the composition of the steel or its uses vary.

Treatment affects the mechanical, chemical, electrical and physical qualities of the metal. High temperatures are not always essential to these changes. Certain steels will become three times stronger at minus 180 degrees Cent. and show very little change in ductility. Other steels, nonmagnetic at ordinary temperatures, become highly magnetic at the temperature of liquid air. Prolonged heating in boiling water will destroy the hardness of a carefully tempered edge tool. Heating a soft steel not ordinarily sensitive to heat treatment, to between 300 and 400 degrees Cent., and then quenching, will show a marked reduction in ductility and a decided difference in solubility when acted upon by chemical agents.

Steels may be separated into three classes: Soft steels up to 0.25 per cent carbon; medium steels from 0.26 to 0.75 per cent carbon and hard steels, or those above 0.75 per cent carbon.

Soft steels, such as sheets, wire, or tubes, are but slightly changed by heat treatment, unless the action be continued over a very long period. In some cases this may prove detrimental. Very few attempts have been made to treat steel of this grade beyond an annealing or normalizing to insure uniform heating and cooling throughout.

Medium steels furnish, by far, the largest portion of the tonnage of all steel produced. In this class is found all the harder and stronger varieties of boiler and ship plates, machinery steel, rails, axles, steel castings, car wheels, shafting, wood working implements, most of the structural and bridge materials, and a large quantity of the steel used in automobiles and agricultural machinery. The medium steels have not always been treated, except for such special cases as armor, guns, crank shafts, connecting and piston rods, or any material in which great strength, durability and security is required. Almost all alloy steels belong to this class. On account of their thermal susceptibility, they are usually heat-treated to develop their best properties.

The anealing of steel castings in important work is essential. Very little strength is sacrificed, while the toughness as indicated by bending or twisting has been increased from two to four times that of the untreated casting.

Railway axles, shafts and forgings were not heat treated in the past. As the alloy steels with their accompanying heat treatments were brought out, attention was immediately given to the treatment of ordinary steels. Most forgings are being heat-treated at the present time. It is believed that the treatment now being given to gears, shafting, rails, wheels, plates, bars and machinery parts will grow until practically all such material will be used in a heat-treated condition.

Hardness of Tool Steels

Hard steels, known as tool steels, are not often used in an untreated state. These steels were the first steels made and were valuable, as they could be made intensely hard by heating and quenching in water. It was found that this hardness could be modified by subsequent heating or tempering, yielding a tool or implement of great value. A temperature of 400 degrees Cent. removes this hardness and makes the tool too soft to cut hard metals.

When the great changes in railway material during the last quarter of a century are considered, it is reasonable to believe that the freight car of the future will regularly carry a load of 100 tons. Its size will only be limited by bridge, tunnel or other clearances. A reinforced concrete roadbed, carrying a track of 150 to 200 pound rails on steel supports, or perhaps duplicate rails laid a few inches apart on each side of the track, will probably be the standard practice a few years hence. As the elastic limit of the axle, wheel and rail are approached, a higher limit will be required, limited only by what the steel maker can produce and by the point to which this may be carried and still retain sufficient traction under engine wheels to move the load. To distribute the load, four wheels may be mounted on the same axle, or additional wheels and axles put under the future car. The effort to secure a strong material of the least weight, in order to reduce the dead load carried, will always exist. Similar progress will be made in the machinery and building world.

Probable Developments

The demand for a stronger, lighter, less corrodible metal will continue and its use be governed by its extra cost in comparison with regular material. Iron rusts more rapidly when exposed than almost any of the common metals. The attempts to protect it by coating or metallic coverings have done much to increase its durability. It is not an exaggerated statement to say that future researches will develop a method of treating iron, which will greatly retard or wholly prevent corrosion. How this is to be accomplished is left to the future. Exposure to a gas or vapor, aided by heat, pressure or the electric current, may render the iron entirely passive, or diminish the effect of atmospheric conditions. It may be that more than such a simple treatment will be necessary, and that after such a passive condition has been produced, it must be fixed or made permanent by additional treatments, as quenching, exposure to other gases or vapors, or to chemical solutions, to obtain the desired result.

Rearranges Sales Forces

B. Nichol & Co., New York, effective May 1, became sales agents for the Davis Coal & Coke Co. in all territory excepting New England, and have taken over the offices of the Davis company in various cities. F. F. Chadwick, formerly manager of the Davis company in Philadelphia, has become manager of B. Nichol & Co., with offices in the Land Title building, Philadelphia, and E. F. Rizer, Jr., formerly manager of the Reading, Pa., offices, has become manager for B. Nichol & Co. there. E. Kelly Rothstein, who has been vice president and general manager of sales of the Davis Coal & Coke Co., has become manager of the coal and coke department of B. Nichol & Co., and the general offices have been moved to the Singer building, New York.

The Corrosion of Steel and Its Prevention[1]

Samples of Wrought Iron Made Hundreds of Years Ago Display Corrosive Resistant Properties—Pure Irons the Solution?

By Allerton S Cushman

The problem of the corrosion of steel may be considered from two distinct points of view. On the one hand we might discuss the manufacture of metal specially designed to be slow rusting and resistant to corrosion, while on the other hand we might confine ourselves to a consideration of methods of treatment by the application of protective coatings or in other ways, so that even the usual grades of commercial steels may be made as rust-proof as possible.

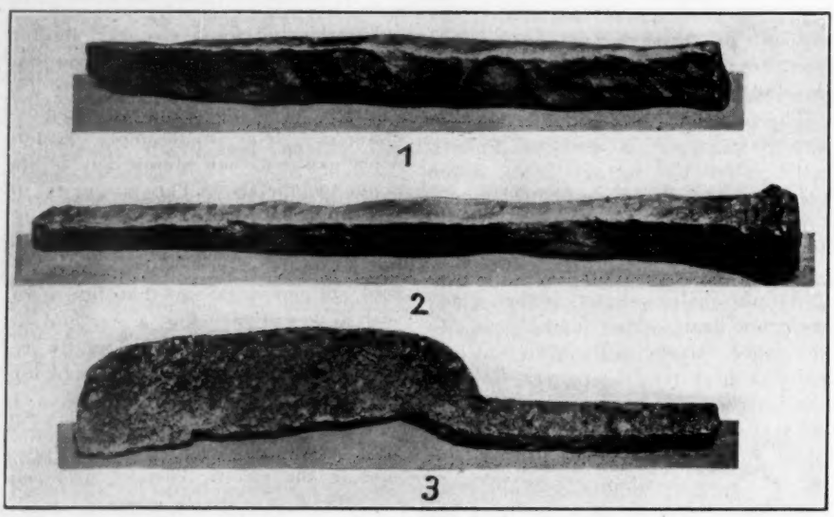


FIG. 1—SPECIMENS OF IRON DATING FROM THE FIFTH CENTURY, WHICH ARE UNUSUALLY RESISTANT TO CORROSION.

It seems to be the general consensus of opinion that the old hand-worked irons which preceded the products of our modern pneumatic processes, possessed a wonderful quality of resistance to corrosion and it is, therefore, pertinent for us to inquire whether a study of ancient specimens of iron and steel may not point the way to improvement on the modern scale of metallurgical operation.

Before proceeding with this line of inquiry, however, I would lke to pont out the importance of bearing in mind that the chemical constitution of iron or steel is only one factor of the problem, for the amount and kind of work that a given product receives will profoundly influence its physical character and qualities. We propose a return to the old hand-worked methods of manufacture, for modern conditions are not conducive to the success of such an industry.

[1]Presented at the annual meeting of the American Iron and Steel Institute.

The most ancient specimens of iron that have been studied, as far as I can ascertain, have been recently reported upon by Sir Robert Hadfield, in a paper on "Sinhalese Iron and Steel of Ancient Origin," presented before the Royal Society and also before the Iron and Steel Institute of Great Britain. These interesting specimens taken from the Colombo Museum consist of a rude chisel, a nail and a bill hook, which date unquestionably from the fifth century and may, therefore, be said to be about 500 years old. Considering that for the larger part of this time these specimens have been subjected to the corrosive influences of nature, they are in a remarkable state of preservation, although showing, as would be expected, some effect of the ravages of time. They are shown in Fig. 1.

The chemical constitution of the three specimens was very similar, as shown by the following analyses:

	Chisel. Per cent.	Nail. Per cent.	Bill hook. Per cent.
Carbon	Trace	Trace	Trace
Manganese	——	——	Trace
Sulphur	0.003	——	0.022
Phosphorus	0.28	0.32	0.34
Silicon	0.12	0.11	0.119
Copper	0.90	0.119	0.012

These specimens would, of course, be classified as wought irons and not as steels, but from the viewpoint of their wonderful resistance to corrosion it is interesting to note that carbon and manganese are absent, with

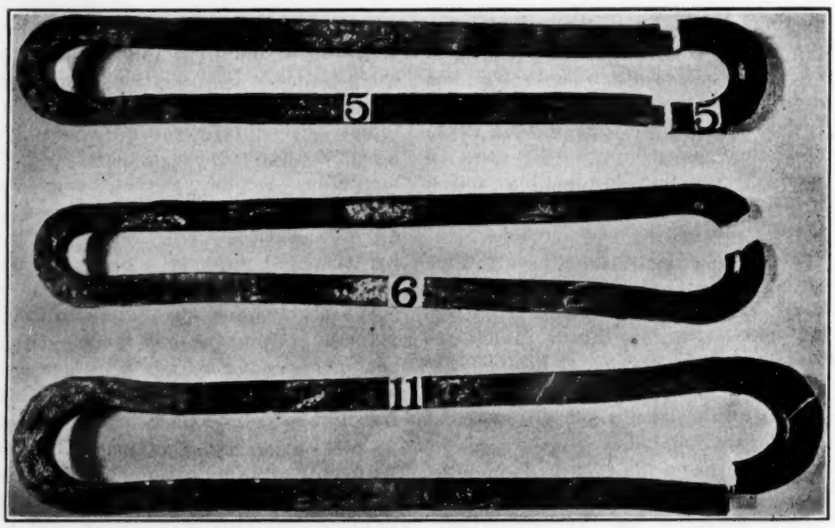


FIG. 2—THREE IRON LINKS IN A WONDERFUL STATE OF PRESERVATION. THESE SPECIMENS WERE OBTAINED FROM THE NEWBURYPORT, MASS., SUSPENSION BRIDGE BUILT IN 1809

very low sulphur, whereas, according to the standards of modern iron metallurgy, the phosphorus content is extraordinarily high. The high silicon content probably represents slag, and if so is not significant. We should expect such a metal to be cold-short and brittle, which it undoubtedly was, but unquestionably material of a very similar constitution could be made today in an open-hearth furnace, and subsequently rolled without giving special trouble.

Wrought Nail

I shall now present some data on some specimens of iron which have been recorded in this country and which have shown themselves to be extraordinarily resistant to corrosion.

The first specimen is an old wrought nail known to have been used in the construction of the Masonic Hall, at Richmond, Va., in 1807. It is shown in Fig. 4, compared with a corroded modern nail.

This specimen came into my possession in 1908 with the information that it had been found half-driven into the old oak studding so that the head and half of the shank was exposed to the weather for the major portion of its century of service. It was in a marvelous state of preservation, the forged edges of the head remaining quite sharp and unrusted. The analysis is remarkably similar to that of the old Sinhalese wrought irons and is as follows: Carbon, 0.03 per cent; manganese, 0.06 per cent; sulphur, 0.013 per cent; phosphorus,

FIG. 3—A WELL-PRESERVED IRON BAND

0.25 per cent; silicon, 0.121 per cent, and copper, 0.027 per cent.

The next specimen, shown in Fig. 3, is an old band or sleeve which was attached to a bronze cannon captured from the British by the American troops at the storming of Stony Point, in 1779. The cannon has been used for monumental purposes and has stood for many years exposed to the full force of the elements. The iron sleeve has been wonderfully rustproof and the old hammer marks made when it was forged are clear and sharp.

The analysis follows: Carbon, 0.010 per cent; manganese, 0.010 per cent; sulphur, 0.005 per cent; phosphorus, 0.07 per cent; silicon, trace, and copper, 0.080 per cent.

Here again we find low carbon, manganese and sulphur, with a tendency toward high phosphorus.

Analysis of Links

Fig. 2 shows three iron links from the famous old link suspension bridge which was built in 1809, at Newburyport, Mass., and known as the Essex-Merrimac chain bridge. This bridge was in continuous use until the late summer of 1909, having completed practically a full century of service. The links have proved themselves wonderfully resistant to corrosion under most severe conditions near the seashore.

The analyses of three separate links, although not the individual ones shown in the illustration, are as follows:

	Link A.	Link B	Link C.
Carbon	0.05	0.12	0.04
	Per cent.	Per cent.	Per cent.
Manganese	Trace	Trace	0.01
Sulphur	0.007	0.01	0.006
Phosphorus	0.032	0.07	0.02
Silicon	0.019	0.047	0.028
Copper	0.43	0.018	Trace

The above analyses were made in the research department of the American Rolling Mill Co. Material from the same bridge has been analyzed and reported by Prof. A. P. Mills, of Cornell University, who concluded that the excellent resistance to corrosion was due to copper, as all the sample links worked on at Cornell showed high copper. The links in which copper was absent were just as long-lived as those which contained nearly one-half a per cent of that element. In this connection it may be noted that the copper content of Sir Robert Hadfield's old irons was variable, and Sir Robert wrote me as follows, under date of March 19, 1912: "As regards the effect of copper in adding resistance, all the specimens are more or less alike; whereas, if this element has any influence the nail ought to have shown less corrosion than the others. I think, therefore, you are right in not accepting the theory that the addition of copper will enable iron and steel to resist corrosion."

Returning to the analyses of the Newburyport links, we find again a tendency to low carbon, manganese and sulphur, with moderately high phosphorus.

Galvanized Roofing

A sample of galvanized, corrugated roofing was found on the Isthmus of Panama, where it had been abandoned by the French many years ago. The corrosive influences are so severe on the Isthmus that samples of this material were passed from hand to hand among metallurgists in this

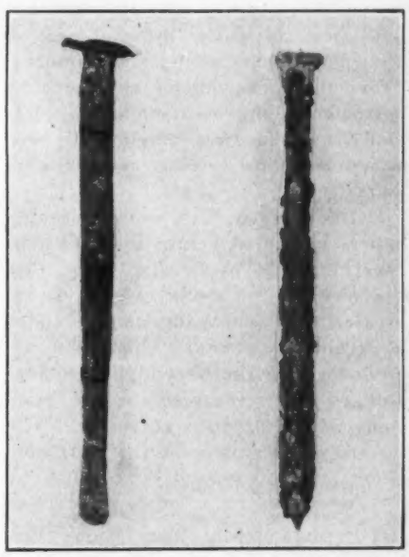


FIG. 4—WROUGHT IRON NAIL IN SERVICE SINCE 1807 AT THE LEFT; AT THE RIGHT IS A CORRODED MODERN NAIL

country, as an interesting exhibit of durable metal. Although the durability may be largely due to the heavy spelter coating, it is more than doubtful if our modern steel galvanized sheet would last as long in that atmosphere. An analysis of the metal is, therefore, of interest, and is as follows: Carbon, 0.02 per cent; manganese, 0.04 per cent; sulphur, 0.061 per cent; phosphorus, 0.427 per cent; silicon, 0.12 per cent, and copper, 0.031 per cent.

The sample was inclined to be brittle, as we should expect with such high phosphorus; but again we find low carbon and manganese, with sulphur moderate.

Sulphur and Manganese

It should be stated that the above examples of ancient irons have not been selected in order to prove any point whatsoever. They represent every authentic case of extraordinary corrosion resistance of which I have been able to make a record.

I do not even make the claim that these records prove anything, but I submit them to your attention as being highly suggestive and interesting. I have long believed and have so stated in many publications that extreme purity in respect especially to manganese and sulphur is a contributing influence toward durability in a material whether it be classified as iron or steel. I am, of course, not unmindful of the metallurgical difficulties in the way of manufacturing steel free from manganese unless the carbon is also to be eliminated. If the carbon is eliminated, we are, in my opinion, dealing with iron and not with steel, no matter by what process the metal has been manufactured. From the viewpoint of resistance to corrosion, manganese might be tolerated if sulphur was absent, but here again we run into a metallurgical difficulty.

It has recently been shown in some papers presented before the Iron and Steel Institute of Great Britain, that the tendency of steels to corrode increases with increasing carbon up to a certain maximum. This is in accordance with the electrolytic explanation of the mechanism of the reactions which produce corrosion. The electrolytic explanation of corrosion is now very generally accepted by scientific men.

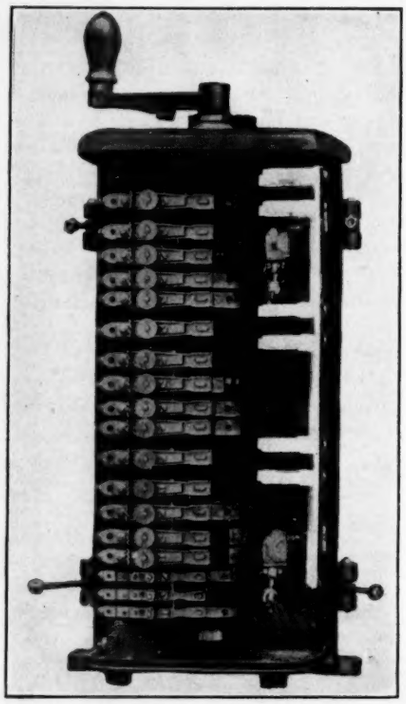
To sum up the conclusions that have been reached as the result of many scientific studies of corrosion, it may be said that homogeneity or freedom from at least excessive segregation is an essential to a high degree of corrosion resistance in either iron or steel. One way to reach homogeneity is to allow little or no impurities to be present to produce segregation, as is done in the manufacture of the very pure irons which are now made in open-hearth furnaces.

The manufacture of commercially pure irons in open-hearth furnaces on the large scale of operation usual in modern steel-making was only a short time ago considered a metallurgical impossibility and even now in Europe there are metallurgists who do not believe that it can be done. Not so long ago a leading British engineer journal stated editorially that the making of open-hearth metal free from manganese was an impossibility, but even if it could be done the metal would be superoxidized and unfit for rolling or for use.

For many years we have been accustomed to turn to Norway and Sweden, when iron of exceptional purity was desired. Now it can be obtained even purer in this country on a larger scale and for less money. In my opinion the accomplishment of the manufacture of iron of extraordinary purity in the open-hearth furnace should be noted and honored, as it would undoubtedly have been had its development taken place on the other side of the Atlantic. From a patriotic point of view, if for no other reason, it is satisfactory to reflect that Europe is now beginning to consider this country as a source of supply for the purer irons for which many purposes there is a growing demand.

We must admit, however, that the manufacture of slow rusting iron or iron alloys is a specialty only to be undertaken by specialists, and that the great mass of steel tonnage that goes into structural material calls for protection from corrosion. We are all more or less familiar with the strenuous efforts that have been made in recent years to improve the methods of coating iron and steel with protective coatings of other metals such as zinc, lead, copper, and various alloys. It is evident that the great mass of steel structural material that goes into service, must depend upon paint coatings for its protection. We all know that there are hundreds of "best paints" offered in the market for iron and steel work. As the only perfect test of paint is a service test, considerable time must elapse and money be wasted before we can find out the facts. We are also frequently confronted with other difficulties. If, for instance, we have concluded that red lead is a safe prime coater, we are suddenly confronted with the fact that all red leads are not alike and also that the conditions and methods of application are important factors.

I am glad to be able to report that great progress has been made as the result of the application of scientific investigation and principles to the general subject of protective coatings. As the result of a systematic series of exposure tests on steel panels erected at Atlantic City under the auspices of the American Society for Testing Materials, we now know how to select intelligently materials for prime coating iron and steel. We have been able to divide pigments, roughly at least, into classes known as "inhibitors" and "stimulators" of corrosion. The discovery that certain substances when laid out in an oil film on the surface of steel actually accelerate, while others check or retard corrosion, gives us a basis of scientific selection on which to write specifications for protective paints.



CUTLER-HAMMER ALTERNATING CURRENT MOTOR CONTROLLER WITH COVER REMOVED.

Alternating Current Motor Controller

A new type of motor starter and speed regulator with the cover removed, built by the Cutler-Hammer Mfg. Co., Milwaukee, is shown in the accompanying illustration. The drum is similar in appearance to the direct-current drum controllers placed on the market last year by this company. Non-stubbing, straight-line contact fingers are used similar to those employed in the drum controllers. An arc-proof shield is mounted under the finger board and is slotted so as to interlace with the deflectors, thereby preventing the burning of the board and the communication of the arc from one finger to another. With the starter the resistance is entirely cut out of the rotor circuit when running normal, while with the speed regulator the operating handle may be moved backward or forward, according to the variation of the speed desired. Standard regulators are arranged to give 50 per cent speed reduction. The resistance used with these controllers varies according to the duty, whether for starting only or for regulating. The cast metal grids are mounted in special mill end frames on two supporting rods which are covered with mica tubing and also are insulated from the end frame by fiber washers and tubes.

IRON AND STEEL SECURITIES

Stock market prices showed a downward drift last week, with occasional weakness being shown by some stocks. Professional trading was in evidence all during the week, sales by insiders being responsible for incidental breaks in stocks regarded as market leaders. There were few developments of any financial importance.

Monday, the market was dull and irregular with prices moving uncertainly. American Can reached the highest price of the year. Tuesday, there was an irregular fluctuation of prices with light trading. London market was heavy, owing to fears of a revival of labor troubles. Wednesday showed a decline in prices followed by a rally at the closing. Reading and Steel common furnished nearly one-third of the business. Copper metal advanced to 16⅜ cents, a new high price for the year. Thursday, the market was active and weak with many stocks declining from 1 to 4 points. Call money remained easy despite large shipments. Friday, there was an irregular recovery in prices. The Bank of France reduced its discount rate from 3½ to 3 per cent, the first change since last September. Copper metal strong, the principal selling agency advancing the price of electrolytic to 16 1/3 cents a pound, the highest for years. Saturday, the market was dull but strong. Several specialties were very strong.

Money on call ranged between 3 and 2½ per cent. Time money showed a supply much in excess of demand. The actual condition of clearing house institutions showed loans decreased $19,063,000; net deposits decreased $3,198,000; total reserve $444,274,000, and the excess of reserves $20,902,500, an increase of $8,982,200. Non-member banks and trust companies showed loans increased $2,673,900; net deposits decreased $1,627,900; reserve on deposits decreased $1,322,900, and the percentage of reserve 19, against 19.3 the week previous. Bank clearings showed an increase of 3 per cent over the preceding week and an increase of 9.7 per cent over the corresponding week last year. Fortnightly railroad statistics showed an idle car surplus of 130,098, a decrease of 8,783 from the preceding fortnight. Commercial failures numbered 308, compared with 263 the preceding week and 253 the corresponding week last year. Shares were sold to the number of 3,664,017, compared with 3,061,400 the preceding week and 3,634,600 the corresponding week a year ago. Bonds, exclusive of government bonds, were sold to the amount of $15,120,000, compared with $16,101,000 the preceding week and $18,619,000 the corresponding week a year ago.

	Clos'g Quo. May 18	Changes in week.	Annual Meeting date 1912	Stock Outstanding	Basis.	Dividend Last Dividend	Dividend Date Last Div. Pay
Allis-Chalmers	1	.....		$19,820,000		.....	
Allis-Chalmers, pr.	5½	+1½		16,050,000	7 cum.	1¾ Q.	Feb., 1904
American Can	39	—3¾	Feb. 6	41,233,300		.....	
American Can, pr.	117	—3⅞		41,233,300	7 cum.	1¾ Q.	Apr., 1912
Am. Car & Fdy.	59	— ¾	June 27	30,000,000	2	½ Q.	Apr., 1912
Am. Car & Fdy., pr.	118⅛	+ ⅛		30,000,000	7 n. c.	1¾ Q.	Apr., 1912
American Loc.	43	— ⅝	Oct. 15	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr.	108	— ½		25,000,000	7 cum.	1¾ Q.	Apr., 1912
American Ship.	50⅜	.....	Oct. 9	7,600,000	4	2 Q.**	June, 1911
American Ship, pr.	101	.....		7,900,000	7 n. c.	1¾ Q.	Apr., 1912
Am. Steel Foundries	37½	—2	Mar. 21	17,184,000	5	1¼ Q.	May, 1911
Barney & Smith	10	.....	June 4	2,000,000	4	1 Q.	Dec., 1907
Barney & Smith, pr.	85	.....		2,500,000	8 cum.	2 Q.	Dec., 1911
Bethlehem Steel	38¾	—1	April 2	14,862,000		.....	
Bethlehem Steel, pr.	71¼	—1¾		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	43½	+ ½	Mar. 19	45,000,000*	5	1¼ Q.	May, 1912
Cambria Iron	43½	.....		8,468,000*	4	2 S. A.	Apr., 1912
Chicago Pneumatic Tool	50½	—1	Feb. 19	6,448,800	4	1 Q.	Apr., 1912
Colorado Fuel	29	— ½	Oct. 21	34,235,500		1¾ Q.	Apr., 1902
Crucible Steel	121¼	+ ¼	Nov. 15	24,578,400		.....	
Crucible Steel, pr.	83½	— ½		25,000,000	7 cum	1¾ Q.	Mar., 1912
Empire Steel	10	.....	Feb. 28	1,254,770		.....	
Empire Steel, pr.	45	.....		2,500,000	6 cum.	2 S. A.	July, 1911
Fay & Egan	75	.....	Feb. 20	1,000,000	7	1¾ Q.	Nov., 1908
Fay & Egan, pr.	115	.....		1,000,000	7 cum.	1¾ Q.	May, 1912
General Electric	169½	— ½	May 14	77,281,200	8	2 Q.	July, 1912
Harbison-Walker	39	.....	Jan. 15	18,000,000	2	½ Q.	Mar., 1912
Harbison-Walker, pr.	99	.....		9,600,000	6 cum.	1½ Q.	Apr., 1912
International Pump	30	— ¼	Dec. 13	17,762,500		½ Q.	Apr., 1905
International Pump, pr.	81½	+ ¼		11,350,000	6 cum.	1½ Q.	May, 1912
Lackawanna Steel	29	.....	Mar. 13	34,978,000		.....	
Lake Sup. Corp.	28½	—1¼	Oct. 2	40,000,000		.....	
New York Air Brake	53	— ½	Mar. 13	10,000,000	6	1½ Q.	July, 1911
Niles-Bement-Pond	95	.....	Feb. 7	8,500,000	6	1½ Q.	June, 1912
Niles-Bement-Pond, pr.	101	.....		2,000,000	6 cum.	1½ Q.	May, 1912
Otis-Elevator Co.	74	.....	Mar. 18	6,358,600	4	1 Q.	Apr., 1912
Otis Elevator Co., pr.	103	.....		6,375,300	6 n. c.	1½ Q.	Apr., 1912
Pa. Steel	60	.....	May 13	10,750,000		.....	
Pa. Steel, pr.	100	.....		20,587,500	7 n. c.	3½ S. A.	May, 1912
Pittsburgh Coal	21¼	— ½	Mar. 12	28,134,600		.....	
Pittsburgh Coal, pr.	88½	—1¼		27,071,800	7 cum.	1¼ Q.	Apr., 1912
Pittsburgh Steel Co., pr.	102½	.....	Oct. 7	7,000,000	7 cum.	1¾ Q.	June, 1912
Pressed Steel Car	35	.....	Feb. 21	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr.	102¼	.....		12,500,000	7 n. c.	1¾ Q.	May, 1912
Pullman	160½	+ ¾	Nov. 13	120,000,000	8	2 Q.	May, 1912
Railway Stl. Spring	34½	—2¼	Mar. 7	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr.	100⅝	+ ⅝		13,500,000	7 cum.	1¾ Q.	Mar., 1912
Rep. Iron & Steel	23⅜	+ ⅛	Oct. 16	27,191,300		.....	
Rep. Iron & Steel, pr.	80	+ ⅛		25,000,000	7 cum.	1¾ Q.	Jan., 1912
Sloss-Sheffield	51	—1½	Mar. 13	10,000,000	5	1¾ Q.	Sept., 1910
Sloss-Sheffield, pr.	100	.....		6,700,000	7 n. c.	1¾ Q.	Apr., 1912
U. S. Pipe & Fdy. Co.	21¾	+3¾	June 26	12,500,000		1 Q.	Dec., 1907
U. S. Pipe & Fdy. Co., pr.	55½	+1½		12,500,000		1¼ Q.	June, 1911
U. S. Steel	70⅞	+1⅛	April 15	508,302,500	5	1¼ Q.	June, 1912
U. S. Steel, pr.	111⅜	+ ⅝		360,281,100	7 cum.	1¾ Q.	May, 1912
U. S. Steel 5s	102¼	+ ⅛		465,189,500	5	5 Q.‡	
Va. Iron, Coal & Coke	61½	.....	Sept. 17	9,073,680		.....	Oct., 1907
Westinghouse Air Brake	170	.....	Oct. 1	14,000,000*		5. †	Apr., 1912
Westinghouse Electric	75	—1⅛	June 12	3,998,700*	7 cum.	1¾ Q.	Apr., 1912

Par value of shares, $100, except those starred (*), $50.
**Includes last 1 per cent payment of 4 per cent extra.
†Stock.
‡Include 2½ regular, 1½ extra and 1 special.

Copper Stocks

New York.—Amalgamated Copper closed 84⅛, a net gain of ⅛.

Boston.—Anaconda closed 42¼, a net gain of 1¼; Calumet & Arizona closed 72¼, a net gain of ¼; Calumet & Hecla closed 485, a net gain of 5; North Butte Mining closed 28⅞, a net gain of ⅞; Quincy Mining closed 89⅞, a net gain of ⅜.

Financial Note

The Amalgamated Copper Co. has declared a quarterly dividend of $1 a share, an increase of 50 cents a share, thus placing the stock on a 4 per cent basis.

THE IRON TRADE REVIEW

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The German Iron Trade

The renewal of the German steel syndicate excluded the B products, finished steel other than shapes and rails, but it is to be inferred that the producers feel the syndicate in its modified form will still be powerful, or the whole idea would have been dropped, instead of a renewal being effected as to the A products, semi-finished steel, beams and rails. It must be remembered that the control of B products was only as to allotments, not as to prices, while the control of A products was and is complete, covering both allotments and prices.

In our last issue, a well known British writer discussed the general effect of the German syndicates, laying especial emphasis upon the great benefit conferred upon the German iron industry by the export bounty system which was inaugurated in 1897. Through the operation of that system, German iron and steel exports have been multiplied by seven as to tonnage, the gain being more than 4,000,000 tons, which is almost double the gain made by American and British exports combined in the same period. Our contributor, however, was doubtful whether the syndicate system would remain a success, on account of the disturbance caused by the "mixed works". In recent years, the Germans have taken to combining successive stages of operation, steel works acquiring coal and coke operations at the one end and finishing departments at the other. This, it appears, causes trouble through conflict between the "mixed" and the "pure" works.

It has been the common remark in the United States that Germany is far ahead of us, having adopted the syndicate system, in essence a price agreement and pooling among producers, when in this country every effort is being made by the authorities to prevent any price agreements. In combining the successive operations, however, we are much ahead of Germany, for in the United States this principle, though illustrated by the case of the United States Steel Corporation, is by no means confined to it. Even the smaller independent steel producers in the United States combine the successive stages, having coke plants and ore mines at the one end and finishing departments at the other, even to the extent of making railroad spikes, nail kegs, fence and fitted structural material. The tardy adoption of the American idea is tending to disturb the operation of the syndicates, and even threatens their continuance at all.

What is particularly important for us to note is that the export bounty system has enabled the German iron industry to operate at practically full capacity for a dozen years, whereby operating costs have been kept down and there has been continuous profit, permitting the steady introduction of economical machinery and processes. Our own improvements are more spasmodic, on account of the great ups and downs in demand which Germany has avoided. When demand is heavy, our surplus earnings are invested in increases in capacity. When demand is light, producers wish to introduce economies, without necessarily increasing output, but do not have the funds. There has not been the opportunity for steady and consistent progress which has been possible in Germany.

Doing Business in the Dark

At a recent convention in Detroit of a body of manufacturers affiliated with the foundry industry, some papers were read and discussed concerning cost-keeping in this particular trade, and also covering the latest shop equipment and methods for economical production. When the officials of this association were requested to make the papers public, they refused to do so on the ground that they contained information which it would not be desirable for their jobbers and consumers to know. A similar policy of secrecy prevailed at recent conventions held at Norfolk by makers of and dealers in machinery and supplies.

It is with no little humiliation that the existence of such a state of affairs in a branch of the iron trade and machinery business of this country must be acknowledged. It is a fact generally admitted, all things considered, that there is no other business in the world in which the spirit of square dealing, justice and fair play is so strongly entrenched as in the iron and steel trade. The policy of the manufacturers mentioned above is, therefore, only more conspicuous and regretable. It is in striking contrast with the policy of such organizations as the Iron and Steel Institute, the American Iron and Steel Institute, the National Founders' Association, the National Metal Trades Association, and the National Machine Tool Builders' Association.

One is forced to inquire into the cause for this policy of secrecy of some associations, when conditions are such that the body of men who purchase and use their products—in other words, those who give them their right to exist—may not be informed regarding shop methods, economies of manufacture and cost-keeping principles. Such an attitude generates suspicion, distrust and condemnation which may be entirely unwarranted by the facts. The inference, however, is that these manufacturers have something to hide; that their profits are too large; that there is favoritism in the treatment of their customers or that they have failed to give the trade the proper benefit of the economies in manufacture which they have achieved. There is no way at present to judge

the truth of these suspicions. Nevertheless, they exist and are strong in the minds of those who deal with such organizations, and the manufacturers concerned have only themselves to blame for this attitude on the part of their customers.

It is such conditions as this that are largely responsible for the unrest, distrust and suspicion now so noticeable in the popular mind of this country and any body of manufacturers which consistently pursues a policy of secrecy and shows a disposition to hide the important facts regarding its business is simply inviting its own destruction.

There is only one way to conduct business in this age and that is with the utmost candor. The days when the phrase, "Let the buyer beware," represented the ruling creed of business have long since passed. The greatest publicity, frankness and honesty, coupled with fair dealing and absolute impartiality regarding prices, terms and conditions, form the only sure rule for success.

Regulating Freight Rates

Charges that rebates, in the guise of unduly low freight rates to favored shippers, are still being given extensively by some railways under the full protection of the law are preferred by Samuel O. Dunn, writing in the current *Journal of Political Economy,* issued by the University of Chicago Press. Too low freight rates, the writer declares, are as pernicious as those which are too high, and he shows how manufacturers who are dominant in railways may be influential in causing extremely low railway rates to be made on the commodities shipped by the manufacturers.

"Is it not," says Mr. Dunn, "the height of absurdity and inconsistency that the people of the United States should deliberately make and keep in effect laws which thus, to a large extent, put the railways at the mercy of big shippers, and then when, largely owing to this, unfair discrimination results, denounce and prosecute the managers of the railways for it?"

We believe that the Interstate Commerce Commission should be given as great power in raising rates which it considered too low as it now has in reducing rates. As we have heretofore pointed out in the ore handling cases recently decided in Cleveland, certain defendants were found guilty of violating the anti-trust law, because as shippers they shared in large profits of dock companies while other shippers contributed toward those profits. The dock companies have been reorganized to meet the views of the Interstate Commerce Commission and the result promises to be satisfactory for all concerned. We believe that a similar policy could be applied to remedy the conditions, of which Mr. Dunn complains. Up to the present time, the Interstate Commerce Commission has accomplished much toward improving conditions, but it has much to learn and needs the co-operation of all well informed men in reaching conclusions upon subjects concerning which it is expected to issue orders.

Injunctions as a Remedy for Illegal Strikes

While no fair-minded man wishes to challenge the right of employes to quit work when they can do so without violating a contract, there are kinds of illegal strikes, such as sympathetic strikes and those declared to prevent the use of open shop materials, against which employers have a perfect right to obtain injunctions. By thus restraining illegal strikes, employers may render service to workingmen who are compelled to go on strike when they have absolutely no sympathy with the strike.

The experience of the American Anti-Boycott Association with the carpenters' union during the past year has conclusively demonstrated that an injunction properly applied can successfully deal with the situation in which union men are not sufficiently interested in the object of a strike to take part in a sympathetic movement and will remain at work if union agitators are prevented from forcing them to quit. In a case in Brooklyn, for example, a strike was called on buildings, where materials manufactured by a certain lumber company were being used. The business agents of the union were promptly informed that the materials were protected by an injunction and the union carpenters completed the work. Frequently it has been found that union members regard their cards as licenses to work and are not in sympathy with such policies of their leaders as result in incessant striking and a consequent loss of wages. We believe that employers in general may well consider whether they cannot serve their employes as well as themselves by a judicious use of the injunction.

Increased Inspection of Rail Making

The plan of increased inspection in rail mills, first worked out for the Harriman lines, and since expanded so that it includes 15 systems with the total of over 90,000 miles, is deserving of more than the brief mention, which it recently received in our news columns. Men may, and do, disagree as to the causes for the breakage of rails, but there is no ground for disputing the proposition that the inspection should be thorough. The new plan is to place an inspector on duty, day and night, in the converting works, another in the blooming mill, another in the rail mill, and still another at the testing machine. This requires eight men in addition to the four or five inspectors heretofore employed. If anything occurs contrary to the specifications under which the rails are being rolled, or to accepted good practice, the facts are reported and the foreman is notified, so that he can remedy the trouble. If the offense is great enough to justify it, the rails can be re-inspected. As the reports giving the records of all heats are furnished to the roads concerned, the engineering departments of the roads have a complete history of the rails, and the action of the rails in service can be watched with reference to their manufacture. Complete staffs of inspectors have been located at a number of mills, and will be at the remaining mills at an early date.

The *Railway Age Gazette* says that a very gratifying feature of this development, and an indication of the more satisfying relations being developed between the steel makers and the railways, is the manner in which the manufacturers have co-operated with the railways and with the inspectors at those mills where the inspectors have already been placed. This certainly is gratifying news and shows that both manufacturers and users of rails have concluded that it is much more profitable in the highest sense to co-operate in bringing about conditions than it is to spend time blaming each other for rail breakages.

MEN OF THE IRON TRADE

(By our Birmingham, Eng., Correspondent.)

Arthur Cooper, whose election as president of the Iron and Steel Institute once more places a practical steel man at the heat of that august and world renowned body, is the very anthesis of his predecessor, the Duke of Devonshire. A remark made at the closing meeting, in proposing a vote of thanks to the president, is highly suggestive. Mr. Scott said the proceeding had been more conversational and less formal than during the last year or two. The general feeling recalls the mood of Beethoven when he said, "Today, I am unbuttoned." The members two years ago welcomed the Duke of Devonshire, when he entered the presidential chair, and his grace did the honors of the occasion at Chatsworth in a way that left nothing to be desired. But by long aristocratic tradition a duke in a way "dwells apart," and is not accessible to common men. His leadership introduced a certain element of starch, of which, when the novelty wore off, the iron and steel men without for a moment reflecting on the duke, who has many excellent qualities, got a little weary. Now they have a man after their own heart. With a president always good-tempered, cheerful and homely, without any airs, and a wholesome simplicity of manner, the members are just now feeling that "the rank is but the guinea-stamp, a man's a man for a' that." From beginning to end the president will be just plain "Arthur Cooper," at home and easy with everybody, and oiling the wheels everywhere. Almost from boyhood he has been in the steel trade, and so may be said to have compressed all practical knowledge, happily blended with the most thorough science. He is a native of Sutton Coldfield, near Birmingham, the breezy and extensive heath which the Midland city prizes so highly. After passing through the grammar school there, he went on to a boarding school at Leicester, and commenced his business life as apprentice to a mechanical engineer. There he went on to the famous works of John Brown at Sheffield, where he became assistant engineer. The determining part of his career was spent in the steel city. To most people, like a celebrated character in "The Pair of Spectacles," he is the "man that comes fra' Sheffield." At John Brown's he became manager of the Bessemer department, and thence went on to a similar post at Brown, Bayley & Dixon's. In 1879 he made the acquaintance of Thomas and Gilchrist, and together they conducted satisfactory experiments which helped in an important degree the basic steel process on the way to the phenomenal success it has since attained. The practical effect to Mr. Cooper was that with his friends he passed on to Middlesboro to found the North Eastern Steel Co., of which for many years he has been general manager, and which has long been a firm of world wide reputation.

ARTHUR COOPER

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While helping himself forward to success, he has found time to serve the industry as a whole. He has been a member of the Iron and Steel Institute since 1874, and was awarded the Bessemer medal for his share in the development of the basic process. At the present time, he is working energetically in connection with the international movement for standardizing the testing of materials, and will probably represent the British steel trade at the conference in America in the autumn in connection with the movement; when no doubt his many friends on your side, where he is very well known, will give him a cordial welcome. Mr. Cooper shows remarkable vigor, and his colleagues hope that the promise of many years of able service in connection with the trade will be fully realized.

Ralph W. Cooke has been appointed industrial agent for the Pennsylvania lines west of Pittsburgh.

Herman Nieter, general sales manager, The Kennicott Co., Chicago, has gone to New York and will be at 50 Church street the months of May, June and July.

George T. Robinson, superintendent of mines for the Cambria Steel Co., Johnstown, Pa., has resigned, to take effect May 31. He has been with the company 21 years.

E. N. Zern, professor of coal mining at the University of Pittsburgh, has been appointed professor of mining engineering at the University of West Virginia, Morgantown, W. Va.

Henry M. Payne, a consulting mining engineer of New York, is now associated with Stephen T. Williams and staff, 346 Broadway, New York, as mining and metallurgist specialist.

J. W. Blair, former treasurer of the American Cast Iron Pipe Co., Birmingham, Ala., is now in charge of the recently opened office of the Lynchburg Foundry Co., at San Francisco.

W. J. Norris has been appointed sales agent for the Parkersburg Iron & Steel Co., and is located at Parkersburg, W. Va. He recently resigned from the Wheeling Corrugating Co.

J. M. Monroe, foreman of locomotive repairs at the Columbia, South Carolina, shops of the Southern railway, has gone to the Hunt-Spiller Mfg. Corporation, Boston, as a representative.

W. H. Harris, for many years foreman of the Miller Iron Co.'s foundry, Providence, R. I., has accepted a position as foreman of the foundry operated by the Lyon Iron Works, Greene, N. Y.

H. O. Swoboda, consulting mechanical and electrical engineer, has opened an office at Pittsburgh, 406 Empire building, and will devote his time

MEN OF THE IRON TRADE

largely to designing electrical and mechanical apparatus.

G. H. Jones, vice president of the Inland Steel Co., is expected home, June 1, from a brief trip to Europe.

I. G. Haas, president of the Empire Plow Co., Cleveland, will return the latter part of this week from a three months' trip to Europe.

J. E. Fries has been transferred to the San Francisco office of the Crocker-Wheeler Co., as Pacific coast engineer. On April 1, the company opened an office in the Title Insurance building, Los Angeles, Cal.

Alfred Still, an English engineer, and author of a number of standard works, has been appointed chief engineer at the mines and hydro-electric plant of the Algoma Steel Co., in the Michipicoten ditsrict of Canada.

Cecil N. Haggart, who recently resigned as bridge designer, office of the New York state engineer, Albany, N. Y., will open an office at 702 Columbia bank building, Pittsburgh, for the practice of structural engineering.

Howard K. Porter, one of the southern representatives of the Lorain Steel Co., Philadelphia, has been appointed manager of the southern railway department of the United States Metal & Mfg. Co., New York, with offices in the Chandler building, Atlanta, Ga.

John H. Kennedy, formerly general superintendent of the Punxsutawney Iron Co., Punxsutawney, Pa., is in charge of the blast furnace department of the Rogers-Brown Iron Co., operating the Susquehanna furnaces at Buffalo.

J. F. Kent, general manager, and W. D. Moore, superintendent of the plant of the American Cast Iron Pipe Co., Acipo, North Birmingham, Ala., have left for a three months' trip through Great Britain, France, Germany and Bohemia.

Edmund H. Bronner has been appointed general manager of the Michigan Central railway, succeeding R. H. L'Hommedieu, who resigned the position recently. Mr. Bronner entered the service of the Michigan Central in 1880 as a draftsman.

Herbert W. Gwyn, Philadelphia, of the Alan Wood Iron & Steel Co., and for many years secretary of the Richard Heckscher Sons Co., operating the Swede blast furnaces, has returned from a trip through the south, fully recovered in health.

William Ellis Corey, former president of the United States Steel Corporation, sailed for Europe May 14 on the Kronprinzessin Cecilie. Mr. Corey is expected to appear as a witness before the hearings in the government suit against the United States Steel Corporation.

W. S. Quigley, vice president and general manager of the Rockwell Furnace Co., New York, has resigned and has organized the Quigley Furnace & Foundry Co., with offices at 50 Church street, New York, to engage in the construction of furnaces for all industrial requirements.

A. P. Finch has resigned from the American Iron & Supply Co., Marietta, O., to accept a position in the Marietta office of the Continental Supply Co., a subsidiary of the Youngstown Sheet & Tube Co., Youngstown. He had been with the American Supply four years.

Walter G. Kirkpatrick, Massena L. Culley, John E. McCorkle Jr., and John R. Baylis have formed a partnership for the general practice of engineering, with office at 703 Farley building, Birmingham, Ala. Mr. Kirkpatrick, chief engineer of the city of Birmingham, will serve the new firm as a consulting engineer.

M. J. Drury, mechanical superintendent of the northern district of the western lines of the Atchison, Topeka & Santa Fe railway, at La Junta, Colo., recently was appointed superintendent of shops, with offices at Topeka, Kan., to succeed John Purcell, appointed assistant to the vice president in charge of operation in Chicago.

H. F. Hall, consulting mechanical engineer, formerly connected with the Wright-Hall Engineering Co., Chicago, has recently been made a director and secretary-treasurer of the Safety Equipment Mfg. Co., with offices at 900 Fisher building, Chicago. This company manufactures a complete line of pressure-reducing valves and other power plant equipment.

S. H. Hamilton no longer is in charge of the Berks Co. (Pa.), prospects of the Manatawny Bessemer Ore Co., having terminated his engagement with that concern several weeks ago. He is now at Ringwood Monar, N. J., engaged in making magnetometric surveys to delineate lenses of magnetite in the Archean rocks of the New Jersey Highlands.

John Purcell, shop superintendent for the Atchison, Topeka & Santa Fe railway, at Topeka, Kan., has been appointed assistant to the vice president in charge of operation at Chicago. The office of superintendent of motive power recently was merged with that of the vice president in charge of operation and Mr. Purcell will have charge of matters in the mechanical department.

George Price, formerly with the Tide Water Bldg. Co. and later with D. C. Newman Collins & S. Fisher Miller, engineers, has been retained by the Flintkote Mfg. Co. and J. A. & W. Bird & Co., Boston, to represent them in the metropolitan distrct, on their lines of building specialties, covering, roofing, waterproof sheathings, waterproofing compounds, etc., with offices at 66 Beaver street, New York City.

W. Gibbons Uffendell, for the past four years architect for the International Harvester Co., Chicago, and Nicholas H. Holmes, formerly designing engineer in the department of bridges and buildings of the Southern Pacific railroad, have formed a partnership under the firm name of Uffendell & Holmes, for the general practice of architecture, specializing in the design of factories, warehouses, power plants, foundries, machine shops, etc. Offices have been established at 1328 McCormick building, Chicago.

W. H. Murphy and James Flinn, Detroit; Temple E. Door, Saginaw; C. A. Weyerhaeuser, Little Falls, Minn.; E. C. Whitney, Ottawa, Can.; Arthur H. Fleming, Pasadena, Cal.; and E. H. Pearson, Chicago, met at Duluth last week preparatory to their annual trip to their iron lands and iron mines on the Mesabi range. Mines owned by these men are the Fayal, Adams, Spruce and Genoa. The late Simon J. Murphy, E. H. Flinn, and Temple E. Door purchased Mesabi land for the timber it produced.

Gary's Address to American Iron and Steel Institute

Expresses Confidence That Manufacturers Will be Vindicated by the Courts and the People—Looks Forward to Government Recognition if Not Regulation

In opening the meeting of the American Iron and Steel Institute in New York, May 17, Judge Gary spoke as follows:

Gentlemen, it is my very great pleasure to welcome you to this annual meeting of the American Iron and Steel Institute. I assure you it is a very great honor to be placed in the position of president of the Institute, as it is a great pleasure to be associated with such as you.

I must apologize for not having prepared a formal address. My time has been very much occupied, largely by circumstances beyond my control. (Laughter.) If, when I should read after it is written up what I may say today, there seem to me to be any inconsistencies or incongruities, I hope you will give me leave to make such corrections as may seem necessary, and that you will consider what may be printed as the representation of what is in my mind.

I may say the Institute is progressing. It is a great satisfaction that during the last year the membership has increased from about 320 to about 425. I think that does not represent the total membership which we may expect during the next few months. I would urge upon every member the desirability of suggesting to others that they join this association. It should be of advantage to all the members. At the suggestion of some of the members of the board of directors, we have during the last year increased the number of directors from 15 to 21 in order to give a fuller representation of the various people and concerns interested in the work of the association; and we have also decreased the admission fee and the annual dues to sums which meet the ability to pay of those who have heretofore refrained from joining the association because the fees seemed too large. Some ideas which we had at the organization of the association have been somewhat changed, and for that reason we felt that the prices which were fixed at the outset for admission and dues were too large. Now that these sums are small, we hope that you will all make a special effort to have your associates, and those of you who represent large corporations, your subordinates, become participants in the efforts which are being made by the association to advance the general interests of all concerned.

Progress of Welfare Work

During the year, we have established and maintained a department of welfare work which has been under the immediate direction, so far as the Institute is concerned, of Doctor Darlington, who is the representative of a committee on welfare, made up of seven members of the board of directors. This committee has been making very substantial progress in the direction of bettering the conditions of the working men. If I may quote from the secretary on this subject:

> "Already the seven-day week has been practically eliminated in all the larger plants of the iron and steel industry, even in the continuous operations, where it had been regarded as unavoidable. Much thought has been given to the question of hours of labor and better conditions are being gradually worked out. The prevention of accidents has been investigated and safety devices costing vast sums of money, but worth all they cost in preventing human suffering, have been installed. A beginning has been made in building up a museum of safety devices, where the best things of the kind known in the world can be seen and studied by members of the Institute. In more and more of the companies, sanitary officers are being appointed, and the health of employes is having more consideration than ever before. Hundreds of thousands of health circulars have been sent out by the Institute. A monthly publication to serve as a medium of communication with its members has been authorized by the directors, and the near future will see the beginning of its publication."

As you know, your president a long time since at one of our meetings took a decided stand with respect to what should be the attitude of the employers of labor towards the employes. And I am glad to say that the directors of the Institute, and other members of the Institute, and the employers of labor generally who are connected with this industry, have fully supported all that has been said and every position that has been taken in favor of establishing and maintaining a position and a comprehensive work which is calculated to promote the welfare of the working men. It is true that we sometimes read in the newspapers criticisms which are unfavorable, but which misrepresent the facts. As a rule, the newspapers are fair and considerate and mean to publish the truth and to do the right thing. But like all others, who are compelled to rely upon information which is gathered from various sources, they are frequently imposed upon, and do an injustice to those who are affected without intending to do so. We have been fortunate in having connected with our work editors of the principal great trade journals, who have always been fair and accurate in their statements. Nevertheless, it is true that at times, by reason of misrepresentation made to some of the newspapers, and as a result of public addresses by men who were careless of their statements and who were not inclined to be fair, and whose efforts seemed to have been to excite a prejudice on the part of employes, some of the leaders in the steel industry have been accused of ill treatment. But I make the assertion, gentlemen, that in no line of industry, at any period in the history of the world in any country, was labor, on the whole, better treated in every respect than it is at the present time by the employers of labor in this great line of industrial activity. (Applause.)

I congratulate you, gentlemen, that you have gen-

erally recognized your obligations, and that you have measured up to your responsibility, not because it paid you in dollars and cents, but more especially because in recognizing the spirit of co-operation, the feeling of fraternity, the feeling of affectionate regard which men occupying high positions are beginning to realize they must entertain in order to get the best results in life, you have from the abundance of the heart taken a position concerning these questions, which is sound and just.

As has been said by some of our speakers at our banquets, we must all the time make it certain that those who happen to be under our control or subjected to our influence, and who are not sufficiently able to care for their own interests, must be protected by us to the fullest extent. And I hope and predict that this Institute will never exert any influence concerning this question which can be justly criticized. I think perhaps it is somewhat remarkable that in view of the fact that certain labor leaders, whose names I need not mention, have made most desperate efforts during the last few months and years to incite trouble, to bring about a feeling of discontent and to cause rupture between the employers of labor in your line of industry and the employes, they have generally failed in their efforts. And because of this, these men, these so-called leaders, have more or less brought about a crusade and carried on a warfare which was directed against you and your interests. But you have, gentlemen, at the present time, a record and a reputation of which you may well be proud.

Institute Affairs

It has been proposed by some of the directors that we should endeavor to bring about more frequent meetings of the members of the Institute, that we should try to get a little closer together, that we should be in more frequent communication; and to that end we should hold at least two meetings during the year. That is a subject which I think at this meeting should be considered and perhaps decided. Whatever may be the wishes of the members of the association, who are not on the board of directors, the board will be very glad to carry out. We would like to make the Institute a home for all its members, and we would like to establish and maintain a relationship which shall keep us close to one another, so that so far as we have the right to do it, we may protect one another against improper assaults of all kinds and descriptions from any quarter and with reference to any question in which we may be interested.

It is also proposed to establish a bureau of statistics, and also in that connection publish and distribute to the members a periodical, which shall furnish information concerning the action of the board of directors and with reference to the trade generally in so far as the Institute has any jurisdiction or may be connected. While arrangements have not yet been completed, the subject matter is in charge of a committee, and I believe that committee will make some arrangement whereby the books and records and work of the American Iron and Steel Association, which has been under the charge and management and has been so admirably conducted by Mr. Swank, may be turned over to the American Iron and Steel Institute. As you know, Mr. Swank is not in perfect health, and the labors which have been imposed upon him are somewhat onerous, and at different times he has suggested to some of the leading gentlemen connected with this industry that he be relieved of his work. And I hope some satisfactory arrangement will be made whereby the Institute may take up and carry on this work, if not as well as it has been carried on by Mr. Swank, yet satisfactorily to all who are connected with the association.

The Meetings in Europe

I think I should refer to the meetings in Europe last summer. Delegates were selected by this Institute to represent it in meetings in Europe, which were calculated to increase the feeling of friendship existing between European manufacturers and American manufacturers, as expressed so admirably by the large number of representatives of Europe, who attended our annual meeting of 1911. The delegates were first entertained in London by members of the industry, who are located in Great Britain. After that banquet, the meeting which had been called to meet in Brussels was held, and was attended by leading representatives of the iron and steel industry from Great Britain, Germany, Belgium, France, Austria, Hungary, Italy, Spain and Russia. A banquet was given by the Belgians during the second day of the meeting. It is not an exaggeration to say the gentlemen there controlled the iron and steel industry of all Europe. They are a splendid type of men. And the reception which they gave to your representatives on these three occasions was cordial and generous and unbounded in hospitality. The spirit shown by our European brethren was magnificent. In everything they did and in everything they said it was apparent that those gentlemen fully appreciated the high position in this line of industry, which you had reached, and the disposition which you had shown concerning the European manufacturers and their interests. And more than that, they extended to your delegates a welcome and expressed a desire to co-operate with you in every way in carrying on in a decent and honorable way the best interests of all who were interested in the trade. I could not use words of exaggeration describing the friendly, cordial, hospitable, co-operative attitude and disposition on the part of these European gentlemen. And those men, I venture to say, may be called upon at any time by any of you to assist you in every possible way. I have thought to quote from the speeches which were made by some of these gentlemen at the banquets or at the annual meeting, but will not take the time to do so now, although I will insert some of them in my remarks, with your permission.

I ought to say that your representatives whom you sent to Europe to attend this great meeting in Brussels—leaving out, of course, your president—did nothing and said nothing at any of the meetings to discredit themselves or those whom they represented. I think they were recognized by the Europeans as of the highest character and the greatest ability and the most splendid type of citizen of any men that could be found anywhere engaged in any line of business.

Character of American Manufacturers

I am justified in boasting somewhat of the American manufacturers of iron and steel. As you know, I came actively into connection with this business about 15 years ago, although I had had some relations with it in one way or another for some few years previous. I do not feel qualified to speak of the old regime. My experience and acquaintanceship was not such as to justify me in undertaking to char-

acterize any of the men or any of the methods in olden times; but I think I will not do any injustice if I say that the attitude, the disposition and the conduct of the manufacturers of iron and steel in earlier years in this country was more antagonistic, more calculated to engender a feeling of great animosity. Certainly some of the methods were ruthless and unrestrained, and injury was brought upon those who happened to be at times weaker financially or otherwise by reason of this aggressiveness, which involved no moral wrong and certainly no legal wrong, but in its results seem cruel. It had been built up and was being carried on upon the basis that it was every man's individual business affair and that everyone had a legitimate right, so far as he violated no legal or moral principle, to even crush his competitor out of existence, if necessary. If I supposed I had exaggerated the conditions, I certainly would be the first to apologize. I only mention them for the purpose of stating that the gentlemen who represented you last summer in Europe were all men with whom you would trust your whole business interests and your whole business fortunes, and the high character as well as the great financial and intellectual merit of these men was fully recognized by our European acquaintances and friends. These gentlemen stated repeatedly in private conversation, and some of them at the meetings to which I have referred, that they were perfectly willing to place their interests in charge of the American manufacturers, if the American manufacturers would show a disposition to reciprocate.

To my mind it was a most remarkable gathering in Brussels. I doubt if any other such meeting, involving the welfare of any industrial department of life, was ever before held. There, in one room, were controlling representatives of the iron and steel industry of the entire world, and all perfectly willing, nay, anxious to come together and remain together on a basis of friendly, open, mutual co-operation, which was calculated to advance the interests of all and to bring injury to none.

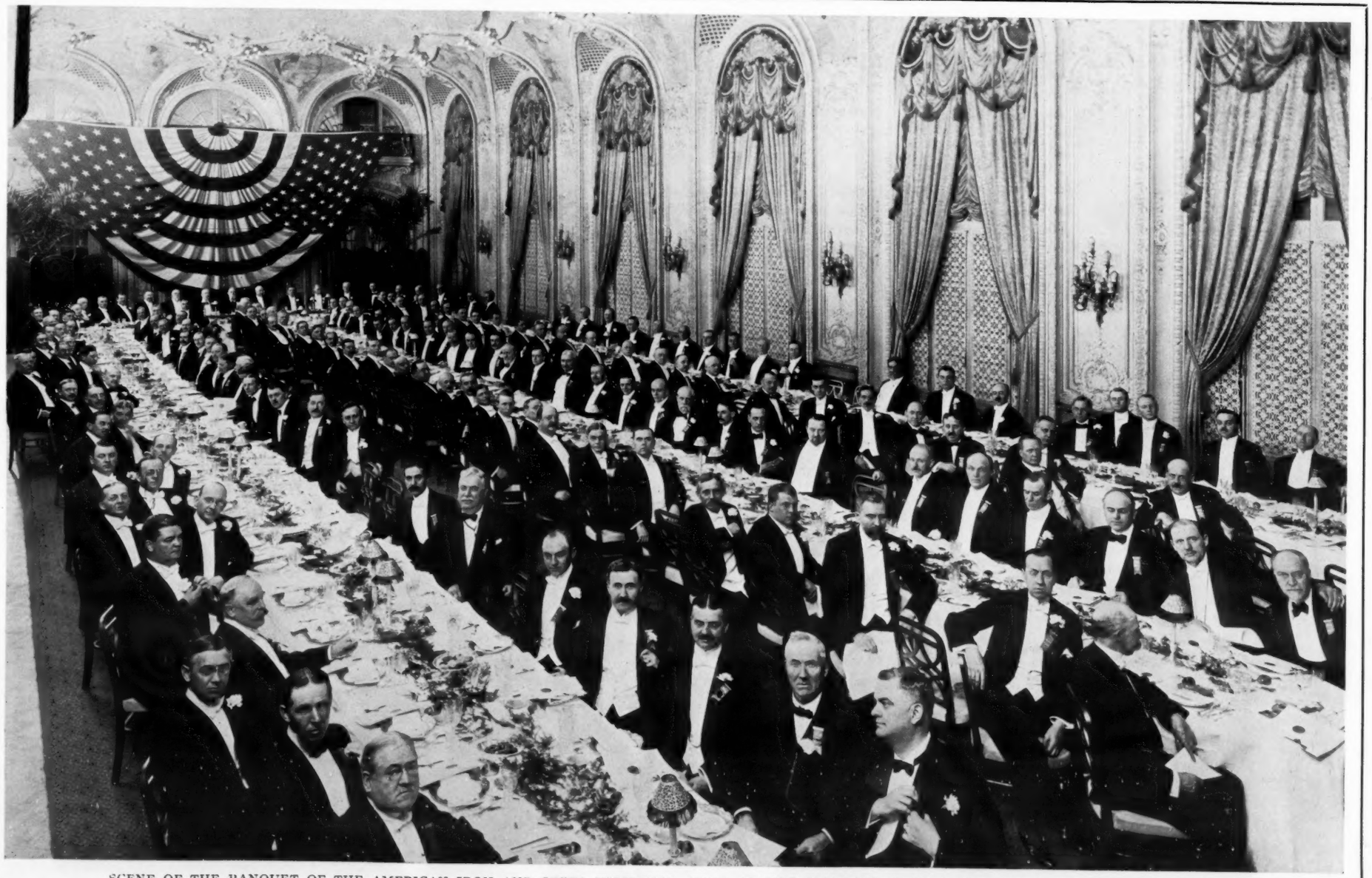
You may ask why no international association was organized in Brussels; for it was understood the object of the meeting was to form such an association. And in connection with that question might be asked another question, as to why the manufacturers of iron and steel in this country are not at the present co-operating as they have co-operated in the past. I recognize the fact that this is a very delicate question. But I deal in frankness. There is no disposition on my part, and never has been so far as I have been connected with this branch of business, to deal in duplicity or to conceal even my motives. My attitude in that respect will never change. In my opinion, co-operation on the part of the manufacturers, as it existed in this country from the time of the unfortunate and terrible financial distress of November, 1907, until the summer of 1911, was always in every respect above reproach and not deserving of unfavorable criticism. And what I have said concerning co-operation is equally true in my opinion of the proposed organization in Brussels by the manufacturers of iron and steel throughout the world.

Position was Sound

I am firmly convinced that, when the last word is said by the courts of highest authority, we shall find that our position during all this time and the things which we have advocated can never be successfully attacked. (Applause.) Nevertheless, you will remember that one member, or possibly more than one member, of a certain congressional committee during the month of June, 1911, criticized unfavorably our co-operation, and also criticized unfavorably the proposed organization of an international iron and steel institute in Brussels; and those criticisms were, to a certain extent, published by the newspapers of this country. I have no doubt there are people who honestly entertained the opinion that the laws of the country had been violated, or if not, that the best interests of the public had not been promoted by your efforts. That being so, it has seemed proper to those who are more or less responsible as the highest officials of the larger corporations in this country, to make certain there was no disposition on our part to antagonize or to defy public sentiment in any respect, or to do anything which should be criticized by any one authority until after all these questions shall have been carefully considered and finally determined. Not that any of these gentlemen have the slightest doubt in regard to the position which they have heretofore assumed, but because they believe it is always a mistake to defy or to ignore public sentiment; because they desire to occupy a position all the time, which entitles them to the respect and the high regard of everyone who may be interested in their efforts.

Unjust Criticism

I think it should be remembered that prior to the month of June, 1911, no one representing the government or any department of the government, judicial, executive judicial or legislative, had ever criticized or objected to anything the representatives of the iron and steel industry in this country had done or said concerning what we have termed co-operation. And when it is remembered also that everything you did and said at all times, had been made public, and exposed to the consideration and criticism, if desired, of everyone, I think it is most remarkable that the general public, so far as we knew, had approved our action; and yet, for one reason or another, many should assume an opposite view. I mention this subject particularly at this time, gentlemen, because I want you to understand that I realize your business conditions during the last year have not been satisfactory. I know that many of you have sold your products at prices less than cost; I know that some of you must have had more or less difficulty in financing your obligations, but, gentlemen, I hope no one engaged in this line of industry will lose heart, I hope you will keep up your courage, I hope you will stand by your guns. Don't give up the ship. You are going to be prosperous in the future, as you have been in the past. Don't make up your mind that your competitor in business is desirous of engaging or



SCENE OF THE BANQUET OF THE AMERICAN IRON AND STEEL INSTITUTE, HELD AT THE WALDORF-ASTORIA, NEW YORK, FRIDAY EVENING, MAY 17

Insert, THE IRON TRADE REVIEW, May 23, 1912

continuing in a different competition than the competition following 1907, which was more satisfactory. Do not believe for a moment that your competitor is your enemy. Competition has always existed and will always exist, and it is perfectly right that it should exist without interruption. I believe in competition thoroughly; I believe the race should be won by the swiftest, that the greatest success should come to him who is the most earnest and active and persevering; but I do not believe in destructive competition, which means bitter, relentless, over-bearing, tyrannical conduct, calculated to drive out the weak and allow only the strong to survive. (Applause.)

The Modern Basis

And so, gentlemen, remember that in the maintenance of friendly relations, in carrying out our disposition to assist rather than to injure our competitors, in being frank and fair and honest with one another, we shall eventually succeed, because that is the right and the modern basis. When a thing is right, it will ultimately and permanently succeed. I should feel very much distressed if I supposed for one moment anyone connected with the trade thought I personally would be a party to anything which would unjustly deprive my competitor of his rights or prevent him from succeeding in the conduct of his affairs to the extent he is entitled to succeed. So far as I am concerned, I do not believe in any secrecy, I think everything should be open and above board, I think the public even should know what we are doing. I would not intentionally place myself in antagonism to the laws of the country or to public sentiment. I have no spirit of defiance.

I consider all these questions most important. And when we ascertain what our rights and obligations are, we must and will live fully up to them. But on the other hand, in so far as we properly can, I hope the manufacturers of iron and steel will stand together, will occupy a position which is so high, so honorable, so generous, that it will compel everyone to recognize the rights of others to the same extent he insists upon his own rights.

Keep Up Courage

So, gentlemen, if there are any who are present here, representatives of lines or of plants or of companies, who are finding it very difficult to meet their obligations because of a basis of business which is unprofitable, I hope you will keep up your courage and stick by your property and devote your time and energies more particularly to preserving your business, until by some kind of government recognition, if not government regulation, you may be allowed to proceed on lines which will permit you to work together, to co-operate and to build up your business and your interests in the future as you have in the past. (Applause.)

I should like to say just a few words concerning the attitude of the members of the Institute. We are passing through an age of peculiar conditions; we are in a transition period. Undoubtedly there is more or less throughout the world a spirit of unrest. This has perhaps been exaggerated, as all such questions are exaggerated. But it is certain the peoples of the world are moving; it is impossible for people to remain inactive and to occupy positions which have long been occupied and which may not be changed. In other words, we are progressive. Now, I am not going to talk politics, but I will say that this word progressive is not dangerous. Simply because a man is called a progressive it does not mean he is a demagog, a socialist, an anarchist or a fool. What we need and what we should stand for, in my opinion, is a conservative progress. If we will only look to both sides of all the questions which are being presented, and from whatever source they come, reasonably, fairly, unprejudicedly, and consider what is for the best interests of all concerned and what should be done in order to adapt ourselves, our business, our daily conduct to the changed and changing affairs of life; if we will recognize the interests of all with whom we come in contact; if we will be more generous, if we will lay aside our selfish disposition, if we will throw off our cloaks of self-righteousness; if we will bring ourselves to the position where we are willing to stop and look and listen and consider, and then determine what progress ought to be made, in every direction, in order to protect and advance the best interests of the entire public, we need have no fear of results and we need not be ashamed of our opinions or our actions.

Rights of the Public

And so, gentlemen, I should like to see the members of this Institute occupy a position which recognizes the rights and interests and claims and criticisms of the public. I hope we shall never be disposed to defy or ignore the public interest or public criticisms. On the contrary, I hope we shall endeavor to profit by everything that may be said concerning us and concerning our affairs. I trust the members of the Institute may get and keep above and beyond the mere question of making money for ourselves; that as citizens of this great republic we may occupy a position and advocate principles which will advance the best interests of the country. Who is more desirous of seeing the principles preserved on which this country is established and maintained than the members of this Iron and Steel Institute? Is there a man in Washington, who fills any office, or represents any faction, better qualified to advance or more interested in advancing the best interests of the country than you? I answer in the negative. Gentlemen, the time will come when the influence of the American Iron and Steel Institute for good will be fully recognized. (Applause.)

Vital Questions Discussed By American Institute

Contract Obligations, Competition, Welfare Work and Other Subjects Receive Attention—Increase in Membership—Plans for Greater Work

Plans for the broadening of the American Iron and Steel Institute into an organization more widely representative of the ramifications of the American iron and steel industry were laid at the second general meeting of the institute held at New York City, May 17 and 18. The sentiment to give the iron and steel industry a body of greater breadth and power that would stand as a vital force in obtaining the technical and commercial advantages of widely-associated effort as well as in protecting the investments of the business against unfair attacks, permeated the remarks of the leading speakers from the two hundred or more iron and steel manufacturers assembled.

Attention was directed to the material reduction recently announced in the initiation fee and dues of the institute as one of the steps taken to further the extension of the membership. Already this action has borne fruit and it was announced by Secretary McCleary that the membership roll has been increased from 320 to 425 in the past year, much of which has taken place very recently.

Along the line of increasing the work of the organization, President E. H. Gary, in his opening address, announced to the members that a statistical bureau would shortly be established and that this would take over the work of the American Iron and Steel Association, so long and ably handled by the veteran historian and statistician of the iron trade, James M. Swank. The institute will also inaugurate in the near future the publication of a magazine through which matters of interest to the members and to the iron and steel trade as a whole will be disseminated. It is expected that this publication will appear monthly.

The sessions on Friday, the main day of the meeting, at the Waldorf-Astoria hotel, were divided by the consideration of three distinct sets of topics. In the morning, business subjects were given attention. E. A. S. Clarke, president of the Lackawanna Steel Co., presented a paper on "Contract Obligations," which was discussed by Willis L. King, vice president of the Jones & Laughlin Steel Co., and James A. Farrell, president of the United States Steel Corporation. Joseph G. Butler Jr., vice president of the Brier Hill Steel Co., treated "Competition; Its Uses and Abuses," and the discussion was given by John A. Topping, chairman of the Republic Iron & Steel Co., and by Charles M. Schwab, president of the Bethlehem Steel Corporation. Technical subjects took up the afternoon meeting. Julian Kennedy, of Pittsburgh, presented a paper on "Some Experiences in India." William R. Walker, assistant to the president of the United States Steel Corporation, had a paper on "Electric Furnaces," which was discussed by Theodore W. Robinson, of the Illinois Steel Co., Eugene B. Clark, president of the Sintering Co., Chicago, and Samuel T. Wellman, of Cleveland. A. S. Cushman, of the American Rolling Mill Co., Middletown, O., spoke on "Corrosion of Steel and Its Prevention," and this topic was discussed by Louis J. Campbell, of the Youngstown Sheet & Tube Co. "Some Metallurgical Developments in the Manufacture of Iron and Steel" was treated by John S. Unger, in charge of the research laboratory of the United States Steel Corporation at Duquesne, Pa., and this subject was discussed by Geo. B. Waterhouse, of the Lackawanna Steel Co.

The papers of Messrs. Cushman, Unger and Clarke will be found elsewhere in this issue.

Will Hold Two Meetings

A resolution prevailed, providing that the institute hold two meetings annually, one in the spring and the other in the fall and that one of these take place in the middle west. The general opinion expressed favored the Pittsburgh or the Chicago territories as the place for the meeting to be held probably next October though Youngstown and Buffalo were also mentioned. Mr. Butler extended an invitation to the Institute to hold the fall meeting of 1912 *at Youngstown. The board of directors is empowered to make the selection of the cities for the two meetings each year.*

The Banquet

The banquet was held in the ball room of the Waldorf-Astoria, Friday evening. Welfare work occupied the time upon this occasion. Thomas Darlington, secretary of the welfare committee of the American Iron and Steel Institute, spoke upon the "Enforcement of Health Laws," and Raynal C. Bolling, assistant general counsel of the United States Steel Corporation, addressed the guests upon "Rendering Labor Safe." William J. Olcott, of the Oliver Iron Mining Co., presented a portrayal of "Mining Operations Upon the Mesabi Range," illustrating his remarks by stereopticon and moving pictures. Mr. Olcott showed the various operations of diamond drilling, stripping, mining, transportation by land and lake and other steps in the process of commercializing the Superior ore deposits. More than 200 guests attended the banquet. Judge Gary acted as toastmaster.

Inspection Tour

On Saturday, the visiting iron and steel manufacturers occupied their time in visiting various points of interest about the metropolis. Some of the places inspected were the terminal improvements of the New York Central railroad, the central power plant of the Interborough Rapid Transit Co. and the Fifty-ninth street power house of the New York Edison Co.

Officers Re-Elected

At the business session, which accompanied the general meeting, the board of directors of the institute re-elected the present corps of officers to serve during the ensuing year.

The officers are: Elbert H. Gary, president; Powell Stackhouse, first vice president; Willis L. King, second vice president; Charles M. Schwab, third vice president; Edward Pailey, treasurer; James T. McCleary, secretary.

Mr. Butler's Paper

Joseph G. Butler Jr., discussing "Competition; Its Uses and Abuses," said:

There is an old saw, or adage, which has been dinned into my ears from my earliest recollection down to the present time: "Competition is the life of trade!" I used to think—we all used to think—that this meant competition in selling prices, and in nothing else. It was very difficult to get away from the idea that "competition is the life of trade" means anything else but with reference to selling prices. Now, what else could it mean?

Well, the world moves. When I first engaged in the manufacture of pig iron—away back in the late fifties—such a thing as an analysis of pig

iron was not thought of. Pig iron was just pig iron. It was made for one specific purpose or another, and for a given purpose there were only two kinds: If it worked it was good iron; if it didn't work, it was bad iron. By and by, however, we began to analyze the pig iron, and then we began to learn very rapidly how to improve it. I remember, incidentally, when we first started in the analyzing business in real dead earnest at Brier Hill. This was in the eighties. For certain purposes, foundries would not use anything but imported Scotch pig iron. We solved this problem by sending out and getting samples of all the well known brands of Scotch pig iron, and had them thoroughly analyzed. We then pursued the matter further by an analysis and proper combination of ores, and it was not very long until we were making the American Scotch, which was equal to the imported.

In recent years, we have begun to analyze this matter of competition, and a great many of us have come to the conclusion, by analysis, that competition covers a great many more things than simply naming the lowest selling prices. Let me give you an illustration. A large steel company, not many years ago, whose board of directors found that its administrative expenses were several times as large as those of another steel company, which nevertheless was efficiently managed, instituted reforms and effected important economies, so that the administrative expense was greatly reduced; thus reducing the cost of steel products. Now, that was competition. The first company was competing with the second to see which could develop the lowest administrative expense. I know of many other instances of a similar nature, and I could multiply indefinitely instances of competition which was not competition in selling prices, but there is no need.

Now, let us examine and analyze this adage, "Competition is the life of trade." Assume, just for the sake of argument, and for that reason only, that it really means nothing but competition in selling prices, each seller trying to name the lowest figure. How will that benefit trade? First, by tending to increase the consumption, for the lower price — other things being equal—the more will be consumed. Second, by placing the seller under the necessity of producing cheaply, for the more cheaply he can produce, the more vigorously he can compete. Admitting, however, that price competition tends to lower prices, it does not follow that it is the only means of lowering prices. We have had in the United States, and still have, many great patent monopolies, men making goods in which there was no price competition, and yet as a rule, these men have striven to reduce prices in order to increase consumption, for enlightened self-interest showed them that the aggregate profits were larger with a large output and moderate profits, than with a small output and large profits per unit. As to price competition furnishing an incentive to the producer to reduce the cost of production, there may have been a time when that stimulus was greatly needed; when men would not think unless they were forced to think, but that is not the case today. Everywhere, men are thinking all the time, trying to reduce the costs of production. They do it in the industries which are subject to sharp competition in prices, and they do it in cases where they are not subject to sharp price competition. Take for example, the underlying companies of the United States Steel Corporation. The competition among the officials and managers of these companies is strenuous in the matter of reducing costs, and in the matter of greater efficiency. The same is true of the independent companies, both large and small. There is much competition going on among the different steel companies to see how the number of accidents can be minimized, by improving modern safeguards. I could go on indefinitely with illustrations of this kind.

I insist, therefore, upon taking a broad view of this word "competition." In a newer and larger sense it really does constitute the life of trade, but not simply in the sense of price competition; in the sense rather of rivalry at all points—in developing new markets, in improving the quality of the goods and adapting them better to the uses for which they are intended, and in reducing the cost of production and distribution.

I am reminded, however, that the subject assigned to me was: "Competition, its uses and abuses." Under the broad definition of competition which I have tried to develop, I find that I have perhaps, said enough already as to the uses. As to the possible abuses, I wish only to remind you that a wise thinker, whose name at the moment does not occur to me, once remarked that many of our vices are really virtues carried to excess, and I can apply that here. When competition in reducing the cost of production is carried to the extent of overworking employes, or depreciating the quality of the goods made, it is a virtue carried to excess, and becomes a vice. The rivalry should be carried on at all points, in endeavoring to give the workmen the best conditions possible, and in endeavoring to make the quality as high as possible.

Now, while we have these various descriptions of competition in business, there is no doubt that competition in selling is a very important feature, and pursuing this method of analysis, I want to emphasize the fact that competing in price is only one of several means of competing in selling. One can compete in quality, in punctuality in delivery, in affording opportunity for inspection, in regularity of service, in remembering the customer's requirements from one transaction to the next, and so on.

Personal friendship counts for much in competition—often used and seldom abused. Generally speaking, the customer who has bought from a particular seller through motives of friendship, is the one who is best satisfied. He had the confidence in his friend when he placed the order, and he is likely to have confidence in the goods when they are delivered. If the order had been secured through a cut in prices, he would be fearful lest the quality had also been cut.

We started out with competition in general, and found by analysis that competition in selling was only one form of competition in business. Then we found that competition in prices is only one form of competition in selling. I want to proceed just one step farther, and analyze competition in prices. All price competition is not of the same nature. There is a price competition which is used only for the sake of securing a given order, because that particular order is needed. There is another form of price competition which is in a separate class and stands all by itself, which our good friend Judge Gary, has brought to our attention from time to time—it is the old "destructive competition," which Judge Gary and others have tried to avoid; when a seller reduces prices, not for the sake of securing a particular order, but for the definite purpose of bringing prices to so low a level that his rival cannot live, and is forced out of the field. This form of destructive competition can do no possible good to society; it tends inevitably towards monopoly. "To the victor belong the spoils;" and the seller who indulges in destructive competition, no doubt has clearly in mind the harvest he intends to reap in advanced prices, as soon as he has destroyed his rival. As we are endeavoring to abolish war between nations, so we should strive just as earnestly to abolish this form of industrial warfare.

It is human nature to strive and indulge in rivalry, and as we realize more, year by year, that we can indulge in competition, in rivalry, without trying to destroy our rivals, so we shall grow better, and aid in the world's advancement, without resigning that inborn desire which we have to do something better than we have done, or than others can do.

Mr. Topping's Remarks

John A. Topping, chairman of the Republic Iron & Steel Co., discussing Mr. Butler's paper, said:

Col. Butler's thought as to the uses of competition, occurred to me several months ago, and with a view to making effective emulation, as a stimulant to greater endeavor, I suggested to a number of the so-called independent rivals of our company, that we arrange for a comparison of selling prices and provide for an exchange of records of steel bar shipments for January, February, March and April and I was not surprised to find rather too wide a variation in prices secured for these products in common markets, to suggest there was equal efficiency in salesmen, making due allowance for other factors of price influence. The effect of competition when applied in this manner, of course, should be to stimulate the low seller to obtain better prices and to build up rather than tear down values.

I have also, for the past year, exchanged with some of our competitors, selling costs and general expense, with a view to thus stimulate by com-

petition, greater efficiency and economy of management.

Franklin says,—"If you do what you should not, you must bear what you would not." If we follow the Franklin maxim, we should avoid the abuses of competition and employ the uses of competition. The abuses of competition may be characterized to mean a war of extermination and a struggle for existence. The uses of competition have not, as Col. Butler states, been properly recognized and in the brief space of time allotted me for discussion, I think it can be better employed by emphasizing the uses of competition as a progressive force rather than multiplying the abuses of competition; in other words, what is desired in my opinion, is to apply rivalry for our own advancement. This feature of competition is being more generally recognized today than ever before—as is evidenced by prizes offered by leading periodicals for most practical articles on conservation of life, health and sanitation. Agriculture is being stimulated by rivalry in soil reclamation and fertilization through the formation of corn clubs, cotton clubs, tobacco clubs, through suitable offerings of prizes in these contests. Manufacturers, recognizing this feature of stimulation by emulation, are paying bonuses and profit-sharing for better methods and practice, as well as for labor and life saving devices. Would it not be to our advantage to extend the uses of competition for our own collective advancement, by employing more broadly than we have, the parallel column of operating results attained, in a manner similar to that employed by each of us individually, as a stimulant to our operating and selling forces?

In conclusion, I offer the suggestion that competition be applied in a co-operative sense—that monthly comparisons be made of such vital statistics as

General Expense and Management.
Average Monthly Shipping Prices.
Employers' Liability Losses.
Production Statistics Properly Detailed.

In this manner, I believe competition can be made the life of trade. The power of Niagara has been harnessed, heavier than air machines have crossed our continent, wireless telegraphy keeps us in touch with the ships that sail the distant seas, the Atlantic and Pacific oceans will soon mix their waters through the great ditch that splits the hills of Panama, the map of the world has been practically completed by the great explorers, Peary and Amundsen, the dark continent of Africa has been opened up to civilization, all of which is a record of recent accomplishment and is largely a result of the influence of competition. Should not we, therefore, bend our energies and intelligence to direct this power of competition for the well being of our labor and capital and to the enrichment and power of this glorious country of ours?

James Russell Lowell says: "Blessed are they who have nothing to say, and cannot be persuaded to say it."

I am in full sympathy with this sentiment and am rather reluctant to talk, but in breaking silence I hope I have at least made a small contribution of a practical character, as to the uses and abuses of competition.

Mr. Schwab's Comments

Charles M. Schwab, president of the Bethlehem Steel Corporation, following Mr. Topping, said in part:

A state of affairs has grown up in the steel business in recent years with which we are all thoroughly familiar, a condition so different from that which existed in the days of destroying competition as to make that old policy out of date and not modern. There were days in this business when by reason of excellence of plant and management one firm had decided advantage over another firm in the cost of production. Today the great underlying principles in the manufacture of steel are so well understood and are so universally practiced by all the companies engaged in the business that the difference in the cost of manufacture has become very small, so small that destructive competition cannot now be safely practiced. We have advanced in manufacturing, we have advanced in our methods of doing business, we have advanced in the greatness of capital for doing business; and we must advance, as the next necessary step, in the method of selling our goods. We must avoid this destructive competition. (Applause.)

Uncle Joe Butler rather shied at the subject, it seems to me, when he said that there are other methods of competing. There are; but they are not the methods that we think ought to be used at our works. We are usually thinking of how we can get the orders and get them at the best possible prices. But, believe me, I am thoroughly convinced that for the success of this great industry of ours, we must pursue, as the fundamental step, the course that Judge Gary so well inaugurated a few years ago. There will be difficulties in its way, but these difficulties must be surmounted. It is my belief that whatever may be the attack of the law or of agitation in the public press, the attack cannot finally prevail because it strikes at the root of the great economy in the building up of an industry. And whenever the just foundation of this policy is attacked by popular sentiment or by radical legislation the attack must and will fail. And I predict for this and all other industries of similar character just as great advancement in the future in the method of disposing of its products as they have had in the past in the manufacture of their products.

Papers and Discussions

Other papers and discussions to be published in later issues of THE IRON TRADE REVIEW are as follows: "Electric Furnaces," by William R. Walker; discussions by Theodore W. Robinson, Eugene B. Clark and Samuel T. Wellman; "Contract Obligations," discussion by Willis L. King and James A. Farrell; "Enforcement of Health Laws," address by Dr. Thomas Darlington; "Rendering Labor Safe," address by Raynal C. Bolling; "Corrosion of Steel and Its Prevention," discussion by Louis J. Campbell; "Some Metallurgical Developments in the Manufacture of Iron and Steel," discussion by George B. Waterhouse.

PLANTS INSPECTED

By Members of Engineers' Society of Western Pennsylvania Last Week.

The officials of the Youngstown Sheet & Tube Co. and the Ohio Works of the Carnegie Steel Co., entertained over 200 members of the Engineers' Society of Western Pennsylvania on Saturday of last week, by affording a very thorough inspection of these two big plants at Youngstown. The society members were taken to Youngstown on a special train, and spent several hours under escort of the operating officials of the Youngstown Sheet & Tube Co., going through their wire and nail plant at Struthers, and then their main works at Youngstown, where every department was gone over and seen in full operation. From this plant, the visitors were taken to the Ohio works of the Carnegie Steel Co., and were tendered a luncheon spread out in the great power house of the works. A special train of flat cars fitted up with seats took the visitors around the extensive ore yards, and the party went through the open-hearth department, blooming and billet mills, and entrained for home early in the evening. The entire works of both companies were operating to capacity, and the engineers were enabled to see some of the latest improved equipment under most favorable conditions. The trip was one of the most successful held by the society during the present season.

Unusual Order Placed for Wrecking Cranes

An order for two 150-ton capacity wrecking cranes has been placed by the Norfolk & Western railroad with the George M. Newhall Engineering Co., Philadelphia. These cranes will be the largest in capacity of their type ever built, the maximum previous unit having been of 120 tons capacity. The Industrial Works, Bay City, Mich., will build the machines. The Newhall company has also recently booked a very liberal volume of orders for heavy railroad equipment from other roads. Its business of this character during the past month was the heaviest in a long period.

Progressive Plans Adopted By Machine Builders

In Convention at Atlantic City—May Change Name of Association —Standardization Commission Created—Nomenclature Discussed

Standardization of parts and design and of other matters pertaining to the metal working machinery industry was materially advanced by the creation of a standardization commission representing all lines of manufacturing commonly included in the machine tool class, by the National Machine Tool Builders' Association at its tenth semi-annual convention at Atlantic City, May 16 and 17. Co-operation with other enginering societies will be sought by this commission to promote the ends desired. Along the line of more clearly determining the vague significance of the term "machine tool," a resolution was presented to eliminate the phrase "machine tool builders" from the association's title and to change the name of the body to the "American Metal Working Machinery Constructors' Association." Action on this proposal will be taken by ballot vote.

The action toward promoting the cause of standardization and toward the clarifying of the nomenclature of the machine tool industry constitute probably the most important legislation accomplished by the builders at the convention. The headquarters of the convention were established at the Chalfonte hotel and the attendance included upwards of 100 manufacturers.

The resolution presented suggesting a revision of the name of the organization, recites that the members are mainly constructors of machines rather than tool makers; that the courts have held that any machine which employes a tool in its work is just as much entitled to the term machine tool as any other machine; and that constant confusion is caused by the use of the term "machine tool," in courts, customhouses, educational institutions, and wherever the term is employed.

Exclude Wood-Working Machines

A negative majority upon the question whether to admit manufacturers of wood-working machinery to membership in the association was reported by a special committee which had taken the vote of the members of the association last November. Expressions of opinion favorable and unfavorable to the admission of these manufacturers as given by a number of the members in voting, were submitted. The consensus of opinion of those opposed was that there was not enough in common in these branches of the machinery industry to warrant co-operation.

Following the presentation of the report, a resolution was presented and adopted declaring that the association confine its memership to manufacturers, builders and makers of metal-working machines and tools.

A resolution expressing the association's appreciation of his work was extended to Dr. S. W. Stratton, director of the National Bureau of Standards. L. B. Alford, editor of the *American Machinist,* had reported to the convention for the advisory committee on cutting tools in this bureau. This committee was continued in power.

President Bullard's Address

President Bullard, of the Bullard Machine Tool Co., Bridgeport, Conn., in his opening address Thursday morning, emphasized how the association had justified its existence and proved its worth in the important events that had arisen in the past six months. He spoke especially of the strength displayed by the association in the recent attempt to remove the tariff upon machine tools and to place them upon the free list. He stated that the association now represents by its membership fully 90 per cent in point of volume of the machine tool industry of the United States and the roll is increasing. Mr. Bullard spoke of the carrying out of the association's determination in the past six months for the appointment of a permanent secretary. As the constitution of the association requires that the secretary shall be a member of the association, he announced that the executive committee had decided to confer the title of general manager upon James H. Herron of Cleveland, who had been selected to this post.

No formal report was made by Secretary Charles E. Hildreth, but President Bullard took the occasion to express the association's highest appreciation of the loyal and active services which Mr. Hildreth has performed in its behalf. Albert E. Newton, of the Reed-Prentice Co., Worcester, Mass., showed a substantial condition of the association's finances in his report as treasurer.

Standardization

D. M. Wright of the Henry & Wright Mfg. Co., Hartford, Conn., presented the report of the committee on standardization.

The committee recommended a permanent commission on standardization. It was afterward provided in a resolution adopted. The committee stated that the courts have ruled that any machine that employes a tool in its work is just as much entitled to the name machine tool as any other machine, so that makers of mowing machines, sewing machines, or any machines except engines, could consider themselves entitled to membership in the association, and hence the name of the association should be changed.

C. Wood Walter, of the Cincinnati Milling Machine Co., spoke for the committee on the matter of prices to be charged educational institutions. In the absence of Fred A. Geier, the chairman, Mr. Walter, also outlined the present status of the pending tariff schedule affecting machine tools.

Resolutions of Appreciation

Individual resolutions were adopted expressing the appreciation of the association to Ex-President of the Association Frederick A. Geier and to C. Wood Walter, of the Cincinnati Milling Machine Co., for their energetic and capable services in representing the machine tool industry at the hearings before the finance committee of the senate in protest against the placing of machine tools upon the free list as proposed by the Underwood tariff bill.

Tribute to F. H. Stillman

The tribute of the association to the late Francis Hill Stillman, of the Watson-Stillman Co., New York, organizer and first president of the National Association of Manufacturers, and a director and a president of the National Metal Trades Assocation, was expressed in the adoption of a resolution of respect.

Committees

The following convention committees were announced by President Bullard:

Auditing—E. J. Fullam, Fellows Gear Shaper Co., Springfield, Vt., chairman; P. S. March, Cincinnati Shaper Co.; Winslow Blanchard,

Blanchard Machine Co., Cambridge, Mass.

Resolutions—W. A. Viall, Brown & Sharpe Mfg. Co., Providence, R. I., chairman; E. C. Henn, National-Acme Mfg. Co., Cleveland, O., C. A. Johnson, Gisholt Machine Co., Madison, Wis.

New Members

The following new members were admitted to the association:

A. D. Quint, Hartford, Conn.; Landis Machine Co., Waynesboro, Pa.; The Hisey-Wolf Machine Co., Cincinnati; Grant Mfg. & Machine Co., Bridgeport, Conn.; Geometric Tool Co., New Haven, Conn.; Gooley & Edland, Syracuse, N. Y.; Joseph T. Ryerson & Son, Chicago; Acme Mfg. Co., Cleveland; Langelier Mfg. Co., Providence, R. I.; Baird Machine Co., Bridgeport, Conn.; Armstrong-Blum Mfg. Co., Chicago.

Announcement was made of changes in names of several members. The Treadwell Engineering Co. replaces on the membership roll The Stoever Foundry & Machine Co., Easton, Pa.; Flanders Mfg. Co. replaces the Grant & Wood Mfg. Co., Pontiac, Mich.; Conover-Overkamp Machine & Tool Co. replaces the Miami Valley Machine Co., Dayton, O.; the Reed-Prentice Co. replaces the F. E. Reed Co., and the Prentice Bros Co., Worcester, Mass.; the Jones & Lamson Machine Co. replaces the Fay Machine Co., Springfield, Vt.

Looking into the Future

Secretary Charles E. Hildreth read a paper which was received with great interest. His subject was "What the Future Has in Store for Us." Mr. Hildreth had prepared a large chart showing the fluctuations of iron prices from 1827 to 1912, and also prices on machine tools over part of the period, or as far back as statistics from members were available. Mr. Hildreth discussed the ups and downs of the iron business as indicated by the chart, and spoke especially of the great panics of the country. In conclusion, he said: "In one way, we have the most stable business known, for there is not a thing the people wear, eat or have as a luxury that is not dependable for its existence on the machines we make. This being so, let us see if the people of this country are being properly supplied. From the United States statistics, this country increased 20 per cent from 1890 to 1900 and 21 per cent from 1900 to 1910. The amount of agricultural implements produced in 1900 compared with our population showed $1.33 per person, the same in 1905, and practically the same in 1910, showing that this industry had produced an increasing amount each year proportionally to the population to properly feed each person.

"Manufacturers of electrical apparatus showed they were providing for the increasing demands in this direction, for figured in the same way, it shows $1.39 per capita in 1900, $1.90 in 1905 and $2.65 in 1910. When we come to the railroads, however, we find a different state of affairs. In 1890, they put out in new equipment $1.19 per capita, in 1905, $1.33, an increase of 13 per cent, while in 1910, only $1.34, or an increase of only 1 per cent during this five year period. The best statistics for machine tools, I could get, showed $.325 in 1900, $.399 in 1905, or an increase of nearly 23 per cent, while 1910 showed only $.428 or an increase of only 7 per cent. Now, during this period of five years and the two years since, this country has added over 11,000,000 people to its population. The time must come, and that pretty soon, when the machinery which provides this great mass of people with the necessities of life as well as the increasing luxuries will have to be replenished and increased through our means. And this replenishment will be no small item in the swelling of our business. During the boom which struck us in 1905, great industries awoke to the fact that the new high speed steels that were then coming into prominence meant dollars in their pockets, if they could crowd them to the limit of their capacity, but found that this steel had outstripped the machines in which they were trying to use them. We all quickly realized the importance of this demand and redesigned our product to meet the new conditions. This replacing of obsolete machines then had only just begun when the freeze-out came in 1908. What this demand will mean, added to the legitimate increase, we can only conjecture, but it is certainly productive of very rosy dreams. I could go on almost indefinitely showing you the lamentable condition our railroads are in with regard to new equipment, extensions and facilities to care for this rapidly growing country, but you are all as well aware of this as I am. What interests us most is, What do the signs of the times indicate for the immediate future?

"Reports of recent substantial revival of railroad buying and of generally enlarged volume of trade in the iron and steel industry, together with advances of iron prices in various centers, make us hope that the

Resolution Adopted for Creation of Standardization Commission

WHEREAS: Standardization has proven of incalculable value to various branches of mechanical engineering, and we conceive it desirable that this association should work toward the fullest application of this principle in our industry, now, therefore,

BE IT RESOLVED: That a permanent standardization commission be established in this association, to receive or formulate, consider and after investigation recommend proposals looking toward standardization of all matters affecting the metal working machinery industry, and further,

RESOLVED: That such standardization commission be composed of one member from each of the regular committees of makers of the various machines constructed by our members, to be elected and serve until their successors are chosen, and also

RESOLVED: That the manager of our association shall be the executive secretary of such Standardization commission, and further

RESOLVED: That any proposal for standardization that receives the approval of a two-thirds majority of such commission shall be thereafter printed and sent to each of our members; but no final action by the association looking to the adoption of the same shall be taken within less than six months from its original submission; and when acted upon shall be either adopted or rejected as recommended, by the commission without amendment, or referred back to the commission, if amendment is desired, for such amendment and resubmission as before; and, when finally adopted by the association, shall be officially certified to each member, and a permanent record shall be kept in the office of the association of all such standards adopted; further

RESOLVED: That it shall be the duty of this standardization commission to co-operate so far as possible with other engineering societies, such as the American Society of Mechanical Engineers, for the purpose of interchanging ideas and proposals with reference to standardization.

country is going to be sane this summer and fall and reap the harvest the natural demands are crowding upon us. If the country is not sane, I am very much afraid we shall find business following the downward trend, but I have too great faith in the American people to believe this will come to pass. The only definite prediction I can make is, that when the country does settle down and confidence returns, conditions are such that the machine tool industry will have the greatest volume of business in its long and glorious history. When this definite prediction will take place, I defy anyone to foretell.

"We are passing through an epoch-making period, more serious for this country's future than was the Revolutionary or the Civil war.

"Then we faced crises that were definite and could be met, as they were, by simple patriotism. Now we are facing a peril, more insidious and vastly more far reaching, than that which France passed through in its Revolution from monarchy to republic.

"Socialism pure and simple lies at the very root of this progressive movement.

"Rightly led and wisely directed, we certainly hope it may be productive of great and beneficial results.

"But should self interest and political intrigue be its motive force, this fair land of ours will be plunged in a turmoil so tremendous, so far reaching, as to shake to its very foundations our ancient traditions of universal liberty and commercial peace."

Will Bind Together the Nations of the World

Prediction of President Cooper as to the Iron and Steel Institute —American Suggestion of a Memorial to Lord Kelvin

(By J. Horton, Associate Editor IRON TRADE REVIEW, *Birmingham, Eng.)*

The personal popularity of the new president probably combined with active conditions of the iron trade to account for the exceptionally large attendance at the annual dinner of the Iron and Steel Institute held, as last year, in the handsome and spacious Connaught rooms, London. The total number of members and guests was 420. America was represented by Joseph Hartshorne, of Pottstown, Pa., a well-known ironmaster, and Mr. Woodbury, a friend.

The feature of the proceedings was the tremendously enthusiastic reception given to Dr. Ing. E. Schrodter, general secretary of the Society of German Ironmasters, especially the unbounded heartiness with which the meeting commended his desire for international good will. A. Greiner, of Seraing, Belgium, had a welcome only slightly less enthusiastic.

J. M. Robertson, M. P., proposed the toast of "Kindred Associations." The speaker mentioned the interesting fact that there are 1,500 scientific societies in the world. Even in the shadow of the terrible disaster to the Titanic, it must be remembered that British ships crossing the high seas during the past ten years carried 6,000,000 passengers with a loss of only nine lives. While the coal strike had started inquiries for fuel substitutes, nobody thought of proposing a substitute for iron and steel. In conclusion, the speaker said he was glad to give an international application to the toast by associating with it the names of Dr. W. Cawthorne Unwin, president of the Institute of Civil Engineers; Dr. Ing. E. Schrodter, general secretary of the Society of German Ironmasters, and A. Greiner, past president of the Liege Association of Engineers and councillor of the International Testing Association.

Dr. Unwin, responding, mentioned that his own association was founded as far back as 1660.

Dr. Schrodter, replying, spoke with great fervor of the work of the institute in promoting international friendship. All his German friends, he said, joined in expresing their high esteem of the new president, Arthur Cooper.

A. Greiner, following in the same strain, mentioned the interesting fact that the institute now comprised 24 nationalities.

Sir Robert Hadfield, proposing the toast of "The Guests," said it was impossible to go to Germany without receiving every kindness at the hands of Dr. Schrodter. While he was astounded at the progress made in Germany, he believed that Great Britain could still hold her own, and a little competition was good for all of them. The Germans were Teutons of the same race as Englishmen, and they all desired good relations to continue between those two great peace-loving countries. Referring to the Titanic disaster, which had made sad the hearts of so many, Sir Robert said all must be astonished that the captain of so great and valuable a ship received a salary of only £1,200 a year.

Sir William White, whose name was associated with the toast, paid a tribute to the work of the president in dealing with standardization reform in Great Britain and throughout the world, and especially in bringing together the users and manufacturers of material, with great advantage to both classes. The president had a personal standing and distinction which should insure his success. Continuing, Sir William White made an interesting reference to an American movement, in which he had taken some part, and which he hoped would be supported by the Iron and Steel Institute, as well as by engineers throughout the world. When he was in the United States it was represented to him that their brethren, the American engineers, including those in the iron and steel industry, were most anxious to have a memorial window in Westminster Abbey to Lord Kelvin, who was buried in the abbey. That suggestion was being taken up by the Institution of Civil Engineers, and they had every hope that the window would be placed in the abbey, to express the respect felt for Lord Kelvin throughout the world. Sir William concluded with a tribute to the valued friendships he had formed with engineers in other countries and quoted a saying at an earlier dinner, "Grapple them to your hearts with links of steel."

President Cooper pointed out that not only were many meetings of the institute held abroad, but 25 per cent of the membership was held by iron and steel makers of other countries. The foreign membership was a source of great strength to the institute, because no nation could claim a monopoly of the brains of the world. The institute had done a great deal to break down the prejudice which formerly sought to withhold ideas from other nations. Two years ago, Lord Strathcona predicted that the institute would bind the empire more closely together, but he, the

president, would go farther, and predict that it would bind together the nations of the world.

Meeting of Iron and Steel Institute

The Andrew Carnegie gold medal was awarded Dr. Paul Goerens, of Aix-la-Chappelle, and the Bessemer gold medal was awarded John Henry Darby, at the annual meeting of the Iron and Steel Institute, held the early part of this month in London.

Andrew Carnegie scholarships were awarded Arthur Kessner, Berlin; Eugent Nusbaumer, Lonion-lez-Liege, Belgium, and J. Allen Pickard, research chemist in the metallurgical branch of the research department of Woolwich arsenal.

A similar award was made to Walter S. Landis, formerly of Lehigh University, South Bethlehem, Pa., but inasmuch as he has left college, he declined the scholarship. Scholarship announcements were made by G. C. Lloyd, secretary of the institute.

The Bessemer gold medal was awarded immediately after Arthur Cooper, newly elected president, took office. He said Mr. Darby, a direct descendent of the distinguished family of metallurgists whose name he bears, was best known in the iron and steel world through his connection with the late Sidney Gilchrist Thomas, and the introduction of the basic process. The first important basic open-hearth furnaces for the manufacture of steel erected in Great Britain were under Mr. Darby's superintendence. He was the first to erect retort coke-ovens at ironworks in England, and some years ago devised a process for the recarburization of the metal in the ladle.

In presenting the Carnegie medal, President Cooper declared no little difficulty had been experienced in making the award because of the meritorious character of all the reports received. Dr. Goerens, born in 1882, was educated at Luxemburg and at the Royal Technical College of Aix-la-Chapelle, where he later was demonstrator in physical metallurgy, materials and fuels. In 1910 he was awarded a Carnegie scholarship of £100, which enabled him to continue investigations on the influence of cold-working on the properties of iron and steel—the results of which won him the gold medal.

The Sykes Metal Lath & Roofing Co.'s plant at Niles, O., has been taken over by the Brier Hill Steel Co. Operations will continue as the Niles plant is operating full.

BOAT FOR GARY

Will be Taken by Chicago Foundrymen—Banquet at Auditorium.

Chicago, May 22.—Arrangements have been completed for the annual reunion of the Chicago Foundrymen's Club. In order to provide for a large crowd, the 1,400-ton steamer City of Chicago has been chartered by the club and will leave the Graham & Morton dock for the trip to the Gary steel plant at 11:00 a. m., Saturday, May 25. Complete arrangements for the entertainment of the visiting foundrymen have been made at Gary and a special train will be provided for their accommodation. Luncheon will be served on the boat and immediately after the return to Chicago, about 7:00 p. m., the party will be conveyed to the Auditorium hotel, where the annual reunion banquet will take place. Any foundryman, whether he is a member of the Chicago Foundrymen's Club or not, will be welcomed on this excursion and it is expected that fully 500 will attend.

Extension Asked for Large Hudson Bridge

Application to congress for another extension of ten years of their franchises, by the two private companies organized to construct a bridge across the Hudson river, connecting Manhattan Island with New Jersey, directs current attention to this enormous project. The great cost of the proposed structure, which is variously estimated from $40,000,000 to $70,000,000, and the improbability of a fee in return upon the investment has thus far prevented the financing of the enterprise, but the promoters still express confidence in the ultimate success of their efforts. Before acting upon the proposed extension, the committee on Interstate and Foreign Commerce is conducting an investigation into the necessity for such a bridge. Controller Prendergast, of the metropolis, in a memorandum on the subject questions the need of the structure and states furthermore that the increased height of the masts of the great ocean liners would now require a height of more than 200 feet above the water, which would add greatly to the length and cost of the bridge.

Form a New Company.—Emanuel Dreyfus & Co., Inc., to deal in iron and steel products, has been chartered under New Jersey laws with a capitalization of $75,000. The incorporators are F. R. Hansell, G. U. Martin and J. A. McPeak. The new company has been formed to carry on a merchant business in old material and iron and steel products similar to that conducted by the firm of Emanuel Dreyfus & Co., Philadelphia, the affairs of which are now being liquidated by representatives of creditors.

ADVANCE ASKED

Puddlers Plan to Offer New Wage Scale Base Soon.

Pittsburgh, May 21.—The bi-monthly settlement of the wage rate between the Amalgamated Association of Iron, Steel and Tin Workers and the Western Iron Bar Manufacturers' Association for March and April showed by examination of sales sheets no change in the average prices for bar iron, and as a result, the wages for mill workers based on this settlement will remain unchanged for May and June, the puddling rate being $5.37½ per ton.

The Amalgamated Association of Iron, Steel and Tin Workers, it is announced, at the next wage conference of manufacturers will present a new scale calling for 25 cents a ton increase in the base rate for puddling, with an advance of 15 cents instead of 25 cents for each $1 increase in the price of bar iron. The same proposition will carry with it the demand that manufacturers will repair all furnaces. Under the new rate with bar iron at the present price, puddlers will be receiving $5.70 a ton instead of $5.37½.

Company Incorporates

The American Tin & Terne Plate Co., Philadelphia, a foreign corporation, has been incorporated as a domestic concern with a capital stock of $100,000. This company will buy, sell, deal in and deal with all forms of iron, steel, copper and tin, and like and kindred products. The incorporators are M. Franklin Straus, the Netherlands, Forty-third and Chestnut streets; Harry C. Straus, 4520 Locust street; Chas. McBride, 1834 South Fifth street, all of Philadelphia, and Ralph C. Lupton, of Wilmington, Del.

The Heer Engine Co., Portsmouth, O., advises that its recent increase in capital stock was for the purpose of extending its works in both new buildings and further equipment. The company expects to install several machine tools and a forge shop equipment.

Corporation's Ore Reserves Are Not Excessive

Said John A. Topping at Dissolution Suit Hearings —Examined at Length Concerning Tennessee Company—Bridge Builders Meet With Colton

Last week's hearings in the government suit for the dissolution of the Steel Corporation were devoted to the taking of further testimony on the absorption of the Tennessee Coal, Iron & Railroad Co. by the Steel Corporation, the formation of the four so-called "Moore" companies, the organization of the American Bridge and American Sheet & Tin Plate companies and on the so-called "Gary dinners". John A. Topping, chairman of the Republic Iron & Steel Co., and formerly connected with the Tennessee Coal, Iron & Railroad Co. in a similar capacity, and John Sterling Deans, chief engineer of the Phoenix Bridge Co., Phoenixville, Pa., were the witnesses. Important testimony was submitted during both examinations.

Mr. Topping was questioned at great length concerning the affairs of the Tennessee company, prior to the time it became a subsidiary of the United States Steel Corporation. He stated that he regarded it as a perfectly solvent concern and that he, as well as others interested in it, had always entertained great hopes for its future. During the time he acted as its chief executive officer, $8,000,000 was expended in improvements to the various properties. The company, Mr. Topping stated, had tremendous reserves of iron ore, coal, timber and limestone properties. Its rail mills were of an obsolete type and its sales of rails were generally made without profit; in fact, they were often attended by a loss. It was able to manufacture foundry pig iron, however, at least $3.00 per ton cheaper than northern producers. Mr. Topping stated his belief, however, that the Steel Corporation was able to produce basic and Bessemer more cheaply at the plants of the Illinois Steel Co. than at those of the Tennessee company. Mr. Topping also stated that the Corporation's ore holdings are none too large, that the Republic company is at a disadvantage in the north through having to transport its ore to Duluth over the Corporation road, that the iron and steel industry in general in the south is not in a flourishing condition and that there never was very much competition between the National and Carnegie Steel companies.

During the examination of Mr. Deans, which dealt with the affairs of the American Bridge Co., Mr. Lindabury, of counsel for the defense, brought to light some interesting facts regarding the Bridge Builders' Society, an organization formed about a year ago, by the 25 leading bridge building companies of the country outside of the American Bridge Co. This society meets once a month, its object being to promote frankness in the exchange of information on bids, terms, tonnage, etc., between the competing companies embraced in its membership. It developed during the examination of the witness that the meetings were never held for the purpose of fixing or maintaining prices or of apportioning tonnage. In fact, H. E. Colton, of government counsel, had attended several meetings by invitation, and he had apparently given the society a clean bill of health. Nevertheless, Mr. Colton, after the witness' examination had been concluded, asked as a special favor, that all reference to his connection with the Bridge Builders' Society be stricken from the record of testimony.

Mr. Topping's Testimony

"Are you a stockholder in the United States Steel Corporation?" asked Judge Dickinson, of Mr. Topping.

"I am not," replied Mr. Topping, with emphasis. The witness admitted that he had refused to give information to government counsel previous to being called to the stand. Mr. Topping was questioned regarding the general state of competition which existed previous to the formation of the American Steel Hoop Co., the National Steel Co., and American Sheet Steel Co. He enumerated the various products and the markets competed in by the companies which were later taken over.

Mr. Topping stated that billets were sold by both the Carnegie and National Steel companies after being taken over by the Steel Corporation but that the competition was very limited.

"Did you ever take part in a syndicate which secured a controlling interest in the Tennessee Coal, Iron & Railroad Co.?" asked Judge Dickinson.

"I did," replied Mr. Topping.

"Who were your associates?"

"As I remember they were Leonard C. Hanna, G. B. Schley, J. B. Duke, John W. Gates, Earle W. Oglebay and Oakleigh Thorne."

The purpose of the purchase was to develop the Tennessee property, not to speculate in it, said Mr. Topping, as it was believed that the property was capable of much improvement. Mr. Topping stated that the difference in the cost of production of foundry iron in the north and south was about $3 or $3.50 per ton in favor of the southern furnaces.

Mr. Topping was asked if at the time the Steel Corporation acquired the Tennessee properties the latter could not produce other grades of iron at a lower cost than any other concern in the country.

"I doubt it," answered the witness. He added that he believed the Steel Corporation could produce Bessemer and basic at a lower cost at the Illinois Steel Co.'s plant than at that of the Tennessee Coal, Iron & Railroad Co.

"How do you know?"

"I don't know," answered Mr. Topping. "but that is my belief from what I have heard from our employes and other sources. I think I have seen the cost sheets of the plants in question for the year 1907."

"Who showed them to you?" asked Judge Dickinson.

"I don't remember."

Mr. Topping stated that during the time he was chairman of the board of the Tennessee company a total of $8,000,000 was expended in improving the blast furnaces and other equipment. This amount, which was raised by stock subscription, was all put into improvements before the Tennessee company was taken over by the Corporation.

Questioned as to orders on the books of the Tennessee company when it was taken over in 1907, Mr. Topping said these included 300,000 to 400,000 tons of open-hearth rails at an average of $29 per ton; also for about 97,000 tons of pig iron. About six months prior to this event, witness said, the company had booked an order for 150,000 tons of rails for the Harriman Lines.

Questioned as to the raw materials owned by the Tennessee Coal, Iron & Railroad Co., Mr. Topping testified that it was the second largest holder of iron ore in the country, its reserves totalling about 750,000,000 tons, much of it being self-fluxing ore. The cost of transporting this ore to the blast furnaces was about 12½ cents per ton, compared with an average cost of $2.20 per ton for northern furnaces. The Tennessee company also owned large quantities of coal and timber land and limestone quarries. Mr. Topping was then questioned in detail regarding the various steel mills, blast furnaces, and other properties owned by the Tennessee company. This testimony was along the same general lines as that submitted by Mr. Topping before the Stanley committee.

The witness also explained a project whereby the Tennessee company, by means of a system of slack water dams in an Alabama river, wished to make the stream navigable

and thus open up a water route by which it might deliver coal to the gulf ports. Mr. Topping appeared in Washington, before the rivers and harbors commission, on this matter but it finally fell through.

In the afternoon Mr. Dickinson asked the witness if he had not made a statement to Lewis Cass Ledyard about 1906 or 1907 as to the value of the Tennessee Coal, Iron & Railroad Co.'s property.

"I made only a general statement to him regarding the manufacturing facilities and the various properties," answered Mr. Topping.

"Were you at that time desirous of selling your stock in the Tennessee company?"

"I was not."

"Did you regard the Tennessee company as being solvent?"

"I did."

"Has the Republic Iron & Steel Co. been a competitor of the United States Steel Corporation for several years?"

"Yes, in merchant bars, plates, tubular products and a few others."

"What does the Republic company pay to have its ore transported from the mines to Duluth?"

"The rate has been 80 cents a ton."

"What roads did you make use of?"

"The Hill road and the Corporation road. These are the only ones serving our mines." Mr. Topping was not certain whether any of these mines were served exclusively by either the Hill road or the Corporation roads.

Witness stated that the amount of material sold by his company for use by railroads has decreased in the last few years. He assigned this loss of business, however, to the falling off in railroad purchases. Mr. Topping stated that about 50 per cent of the pig iron made by the Republic Iron & Steel Co. in the Birmingham district is brought north of the Ohio river.

Published Broadcast

"State whether or not the Republic company reduced prices in certain lines during the past two years," said Judge Dickinson.

"It did."

"In what products?"

"In steel bars."

"Did you notify Judge Gary previous to the reduction?"

"We published it broadcast."

"But did you notify Judge Gary before you reduced the price and before you announced it in the press or in any other way?"

"I did."

In cross examination by Mr. Lindabury, Mr. Topping stated that he was with the Aetna-Standard Iron & Steel Co., Bridgeport, O., from 1877 to 1900. He was president of that company the latter portion of this period. Later he became first vice president of the American Sheet Steel Co. He stated that the American Sheet Steel, American Steel Hoop and American Tin Plate companies were all customers of the National Steel Co. The latter company at times could not produce enough to supply the demands of these three companies and they accordingly entered the open market. Hence, the witness admitted, there was not any important competition between the Carnegie and National Steel companies.

"Who originated the syndicate which took over the Tennessee Coal, Iron & Railroad Co., and of which you were a member?"

"Grant B. Schley and Charlie Guthrie."

"With whom did you discuss the matter of selling your stock in 1907?"

"We held a meeting of the financial committee in regard to what action we would take individually."

Mr. Lindabury then questioned the witness at great length as to the conditions prevailing at the time the Tennessee company was taken over by the Steel Corporation. The witness told about a meeting at J. P. Morgan's home on a Sunday afternoon in 1907 at which a number of men were discussing the seriousness of the business situation. Mr. Topping particularly remembered the occasion because of noting Mr. Morgan's collection of Bibles. In answer to Mr. Lindabury's question, Mr. Topping stated that it was not the sight of the Bibles but the presence of a large number of men of national prominence which made him realize how serious the situation was. Mr. Topping stated that the order for 150,000 tons of rails from the Harriman lines was booked at $29 a ton and that the company did not expect to make money at this price, because its equipment was obsolete.

In regard to pig iron, Mr. Topping stated that Cincinnati and St. Louis were the two good markets in the north for southern iron. Mr. Topping said that generally speaking, the iron and steel industry is not in a flourishing condition in the south. His company, however, has been operating at 100 per cent for the past 18 months in the Birmingham district and the Woodward company has been running well. He would not speak of the Sloss-Sheffield Steel & Iron Co.'s affairs when questioned on this subject.

"What percentage of the total iron and steel output of the country did the Tennessee Coal, Iron & Railroad Co. produce at the time of its taking over by the Steel Corporation? Wasn't it 1.7 per cent?" asked Mr. Lindabury.

"That or less, I should say," replied the witness.

Mr. Topping stated that there was no competition between the Steel Corporation subsidiaries and the Tennessee company in the sale of pig iron. Asked as to the cost of producing standard steel rails, he stated that it cost more to manufacture them at the Tennessee company's mills in and previous to the year 1907 than anywhere else in the country, so far as he knew. He stated the Steel Corporation had since expended much money for improved equipment.

Counsel asked Mr. Topping if, at the time the Republic Iron & Steel Co. reduced the price of steel bars a year or so ago, he had notified Judge E. H. Gary on account of any obligation to do so.

"I did it merely as a matter of business countesy," said Mr. Topping. "I notified him at a meeting of the directors of the Iron and Steel Institute, of which I am a member."

As to Ore Supply

Asked as to the Republic company's iron ore supply in the south, Mr. Topping stated it amounted to 88,000,000 tons, from which 750,000 tons are taken annually. In the Lake Superior region, the company has reserves of 40,000,000 tons. During the past three years it has taken on an average of 1,300,000 tons per year from the latter supply. On the basis of 1,500,000 tons a year, Mr. Topping said, this supply would last for about 25 years. He said he would feel more comfortable if he had a source of supply which was good for 50 years. He did not think the Corporation's reserves were any too large. The Republic company has not added to its southern ore properties since 1906. In the Lake Superior region its holdings have increased from 19,000,000 tons at that time to 40,000,000 tons at present.

Mr. Topping was asked questions relative to the development of the Republic company. He described briefly the integrating process by which that company has gradually abandoned its scattered plants and concentrated its producing facilities at a number of advantageous points.

"Is your company, as a competitor of the United States Steel Corporation, at a disadvantage because of the Corporation's control of ore carrying railroads?" asked Judge Dickinson in redirect examination.

"It is," replied Mr. Topping. Mr. Topping stated that his company felt this disadvantage in the trade.

Mr. Dickinson endeavored to determine the purpose for which was called the meeting of the directors of the American Iron and Steel Institute when Mr. Topping announced to Judge Gary that his company would reduce the price on steel bars. Mr. Topping stated that it was a business meeting of the directors. E. A. S. Clarke, president of the Lackawanna Steel Co., James A. Farrell, and E. H. Gary of the Steel Corporation, Willis L. King, vice president of the Jones & Laughlin Steel Co., James A. Campbell, president of the Youngstown Sheet & Tube Co., and James McCleary, secretary of the institute, were among those present.

"Why did you make the announcement?" asked Mr. Dickinson.

Matter of Moral Obligation

"As a matter of moral obligation, of business courtesy and common decency," answered Mr. Topping.

"Was there no agreement in existence which required you to make this announcement?"

"Absolutely none," said Mr. Topping, emphatically.

Judge Dickinson inquired into the so-called "Gary dinners".

"Were you present at a luncheon given by Judge Gary on Jan. 11, 1911?"

"I was present at that and almost every other of the luncheons given by Judge Gary to the iron and steel manufacturers," answered Mr. Topping.

"What was the consensus of opinion among the attending manufacturers, following such meetings?"

"There was a feeling that we must protect ourselves by protecting our own customers against a break in prices."

"Did Judge Gary say at this particular meeting, 'Each must be satisfied with a proportion of the business'?"

"I do not especially recollect that."

"Was not the effect of these meetings to maintain prices?"

"Yes, but there was no feeling that the necessity was 'dearer than life'," answered Mr. Topping.

"Do you recall that at that dinner Judge Gary spoke of the high moral obligation each one present owed to his competitor, of the necessity of refraining from trespassing on his neighbor's territory, etc?"

"Oh, in a general way, yes."

"Were these remarks taken seriously?" asked Judge Dickinson.

"Not as seriously as report has led you to believe," replied the witness. "We made some allowances for post-prandial oratory."

"How long a period did these 'Gary dinners' extend over?"

"Not as long as it should have been."

Never in a Pool

"Were you ever in a pool, Mr. Topping?"

"No, I never participated in one; but that is only because I did not have the opportunity for I believe a pool to be a highly desirable business arrangement."

Mr. Topping was asked if he would now participate in a pool if it could be legally arranged.

"I certainly would," he replied.

"When did you first hear that the United

States Steel Corporation intended to take over the Tennessee Coal, Iron & Railroad Co.?" pursued Judge Dickinson.

"About Nov. 3, 1907," said Mr. Topping. "I notified the directors of the company on Nov. 5."

Mr. Topping stated that the stock which he bought from the syndicate originally cost him $110. He sold his stock to the Steel Corporation for $119. For the bonds, par was offered, but Mr. Topping did not sell his bonds. He stated he did not know what others sold for. Mr. Topping said further that he did not sell because of unpaid stock subscriptions.

Mr. Topping was again cross-examined by Mr. Lindabury in reference to the growth of competitors of the Steel Corporation since the organization of the latter. He stated that most of the independent steel companies had doubled their output since then. This he believed to be a fair statement.

Independent Bridge Builders

John Sterling Deans, chief engineer of the Phoenix Bridge Works, Phoenixville, Pa., was asked to state the products which that company sold in competition with the American Bridge Co.

"Heavy railroad bridges and bridge materials," answered Mr. Deans. The witness then gave testimony relating to a large number of structural steel fabricating and erecting companies throughout the United States. He tetsified as to the capacity and the line of work engaged in by these companies.

"What proportion of the bridge manufacturing companies of the country went into the American Bridge Co. when it was formed?" asked Judge Dickinson.

"From 60 to 75 per cent, I should say," replied Mr. Deans.

"What proportion of the structural fabricating business of the country, including buildings and bridges, is done by the American Bridge Co.?"

"At least 50 per cent," said Mr. Deans.

At present, the witness stated, the American Bridge Co. is booked to capacity for a year ahead; its independent competitors, on the other hand, have booked enough business to keep them busy for about one month ahead. Mr. Deans stated that from his knowledge of fabricating costs and other details, he felt certain that the American Bridge Co. had some desirable arrangement with the Steel Corporation mills.

He stated he could only assume that the Bridge company purchased its material from the Carnegie Steel Co., the Illinois Steel Co., or the Pencoyd works. Asked as to the American Bridge Co.'s power to take business during dull times, Mr. Deans said it lay only in its ability to underbid other companies.

Government Counsel Invited

In the afternoon, Mr. Deans was questioned by Mr. Lindabury as to the various companies which were not taken into the American Bridge Co. at the time of its formation. Asked upon what he based his statement that the American Bridge Co. did fully 50 per cent of the structural business of the country, Mr. Deans mentioned the reports of the trade papers and the records of the Bridge Builders' Society.

The latter, he said, is an organization composed of the 25 leading bridge building companies of the country, outside of the American Bridge Co. It was organized about a year ago, has a secretary and maintains offices at 30 Church street, New York. Its counsel is Robert J. Eddy, of Chicago. The members, said Mr. Deans, meet once a month, usually in New York, but sometimes in Pittsburgh and Cleveland, to discuss prices, the state of the business, etc. It is customary, said the witness, for the members to announce the prices they are charging and will charge during the next month. The various members also send copies of all their bids and the orders they receive to the office of the secretary at New York and these figures are then immediately announced to all the other members. Mr. Lindabury produced a copy of the constitution of the society and read a portion as follows:

"The object of this society is to promote frankness in the exchange of information regarding bids, terms, tonnage booked, etc., between the competing companies composing its membership."

It developed, during Mr. Lindabury's cross-examination of the witness that Henry E. Colton, of government counsel, had attended the meetings of the society on several occasions, by invitation. Mr. Lindabury had also been invited to attend one of the meetings.

Judge Dickinson, in redirect examination, questioned the witness further with regard to the affairs of the Bridge Builders' Society. The witness stated that the society never endeavored to fix prices or the amounts of bids, or to regulate the distribution of tonnage in any way. He admitted, however, that the amounts of stated bids which were submitted to railroads, municipalities, etc., were announced to the various members.

"Are or have there ever been any understandings or agreements as to prices to be charged?" asked Mr. Dickinson.

"No," answered the witness. "We simply exchange information regarding the prices we have charged and the tonnage which has already been booked."

"Did you ever feel yourself under any obligation, moral or otherwise, not to go after your competitors' business as a result of what transpired at the meetings?"

"I did not," answered Mr. Deans.

Mr. Colton, after the conclusion of the taking of Mr. Deans' testimony, requested the Corporation counsel to remove from the record any mention of his connection with the Bridge Builders' Society.

"Afford to Pause."

The hearings were adjourned on Thursday afternoon to give the opposing counsel an opportunity to attend to other duties and to permit Mr. Severance to make a trip to St. Paul Also, Mr. Colton stated to the representative of THE IRON TRADE REVIEW that the government could afford to pause for a few days as it has proceeded farther in the taking of testimony than it had originally expected.

CHANGES OWNERSHIP

Baldwin Co. Directors Buy Southwark Foundry & Machine Co.

Announcement is made that the Southwark Foundry & Machine Co., Philadelphia, changed ownership recently. The old board of directors retired and a new board was elected as follows: Alba B. Johnson, Samuel M. Vauclain, Holstein DeHaven Bright, John P. Sykes, Reeves K. Johnson, Alba B. Johnson Jr., Jacques L. Vauclain, Andrew C. Vauclain. The new officers are: President, Holstein DeHaven Bright; vice president and treasurer, James H. Maloney; secretary, Alfred C. Maule.

MACHINERY MEN

Hold Conventions at Norfolk—Various Matters Discussed.

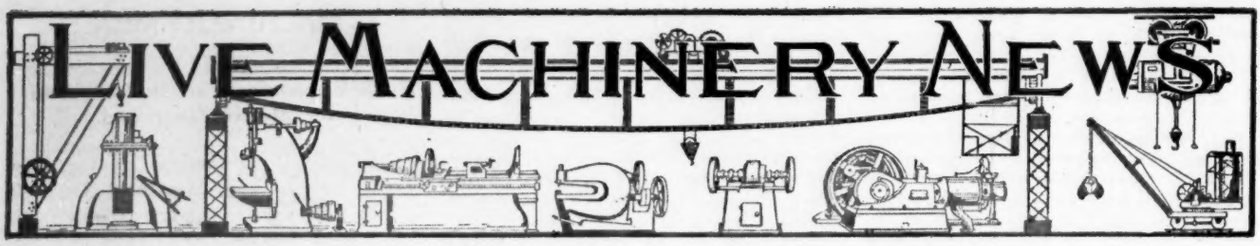
The annual conventions of the National Supply and Machinery Dealers' Association, the Southern Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association, were held at Norfolk, Va., the first three days of last week. Matters of importance to the members and the trade were discussed at the meetings. These topics included re-sale prices, cost of handling small orders in broken packages, distribution of advertising literature, problems of salesmanship, etc.

The American Supply and Machinery Manufacturers' Association chose the following officers: President, N. A. Gladding, of E. C. Atkins & Co., Indianapolis, Ind.; first vice president, D. K. Swartwout, of the Ohio Blower Co., Cleveland; second vice president, C. H. Jenkins, of the Moran Flexible Steam Joint Co., Louisville, Ky.; third vice president, Farmer Yardley, of Jenkins Bros., New York. R. T. Hodgkins, of the Yale & Towne Mfg. Co., New York, was elected chairman of the executive committee.

Officers chosen by the National Supply and Machinery Dealers' Association were: President, W. L. Rodgers, of the Pittsburgh Gage & Supply Co., Pittsburgh, Pa., re-elected; first vice president, Henry Prentiss, of the Prentiss Tool & Supply Co., New York; second vice president, J. O. Harron, of Harron, Rickard & McCone, San Francisco; secretary-treasurer, Thomas A. Fernley, Philadelphia. The advisory board comprises Edgar E. Strong, of the Strong, Carlisle & Hammond Co., Cleveland; George Puchta, of the Queen City Supply Co., Cincinnati, and W. M. Pattison, of the W. M. Pattison Supply Co., Cleveland.

The Southern Supply and Machinery Dealers' Association elected S. M. Price, of the S. M. Price Machinery Co., Norfolk, Va., to succeed himself as president. Other officers elected were: J. F. Young, of the Young & Vann Supply Co., Birmingham, Ala., first vice president; second vice president, John A. Harrin, of the Peden Iron & Steel Co., Houston, Tex.; secretary-treasurer, Alvin M. Smith, of the Smith-Courtney Co., Richmond, Va.

A boat ride around the harbor and down to Hampton Roads brought the conventions to a close on Wednesday afternoon. The place of holding the next convention was not decided upon, but it is probable that Indianapolis will be selected.



In New York the leading development of the past week was the placement of orders for about $50,000 worth of shop equipment by the Delaware & Hudson Railroad Co. The company's original list involved more than $200,000, but the shop buildings, under construction at Watervleit, N. Y., are not far enough advanced to warrant placing the entire list. The General Electric Co. has issued a small list of machine tool requirements for the Schenectady factory. Dealers in contractors' supplies are expecting an active demand for excavating, hoisting and conveying machinery when the New York subway awards are announced. Bids on the Lexington avenue line are being considered and awards are expected in the near future.

In Pittsburgh machinery men are reporting better inquiry, and a larger volume of small business, with the general outlook of the trade much improved during the past week, but actual bookings are not of any importance individually. Prices are still below what would be satisfactory in view of the advanced cost of raw material. There is still considerable idle capacity in the district, and until this is better occupied, a betterment in prices is not expected.

In Cleveland, several good inquiries are out for power plant equipment, although these may be pending several weeks. The machinery tool market remains about the same. No orders of any consequence have been received; the number of small orders, however, has made conditions fairly satisfactory. Second hand machinery business is rather quiet generally, although one dealer reports he has several large considerations pending.

In Chicago and western markets the machinery trade is moving along easily without any special features. Negotiations for the tools included in the Canadian Northern list, which was published in THE IRON TRADE REVIEW, *are still under way and several other small railroad lists are about to be placed. May has not brought out any special amount of new business.*

Machine Tools

Hughes High School, Cincinnati, is in the market for a few machine tools.

The Cincinnati branch of the Ford Motor Car Co., Detroit, Mich., will enlarge its garage and install additional machinery for repair work.

The Automatic Machinery Co., Indianapolis, Ind., will enlarge its plant and install machinery for the manufacture of bottling and labeling machinery.

Additional machine tools will be installed in the Memphis, Tenn., plant of the Virginia Bridge & Iron Works, Roanoke, Va. An addition to the plant will be built.

Phleps & Son, Cloverport, Ky., will require power and special machinery for a button factory which they will operate in the near future. A building is now being erected.

Edward Manion, Henderson, Ky., is in the market for an electrical pump to be installed in a reinforced concrete well for the construction of which he has the contract.

The R. E. Harryman Machine Co., Louisville, Ky., is considering installing additional machine tools, following the increase in floor space secured by the construction of an addition.

The Kentucky Stone & Sand Co., Lawrenceburg, Ky., will purchase machinery for operating its plant and handling sand. Pumps, grinding equipment, conveyors and other machinery will be needed. T. B. Ripy is manager of the company.

The Pittsburgh Screw & Bolt Co., Pittsburgh, has purchased the property and buildings of the North Side shops of the Riter-Conley Mfg. Co. As soon as the property is vacated by the former owners, it will be equipped for the screw and bolt industry, and the present works will be moved to that site. It will permit of a large increase in capacity, and much additional machinery will be required.

New Construction

The Public Service Electric Co., Newark, N. J., will build a sub-power station on Fenwick street, near Frelinghuysen avenue, Newark. The estimated cost is $11,000.

The Woods-Lloyd Co., Pittsburgh, glass house supply manufacturer, whose three buildings were destroyed by fire on May 12, will rebuild and equip the same at once.

The National Automobile Body Co., Ltd., capitalized at $150,000, has secured a site at Windsor, Ont., and will erect a plant at once which will employ 100 men.

Plans have been filed with the New York City building department, for an eight-story factory to be erected at 10-12 West Fifty-seventh street. The structure will be 47 x 90 feet, and is estimated to cost $100,000. Maynicke & Franche, architects, 25 Madison avenue, prepared the plans for the Frescuer Realty Co., 562 Fifth avenue.

J. J. McMillan, Dover, Ky., has announced plans for the construction of a coal elevator, and will be in the market for equipment in the near future.

Contracts have been let for an additional manufacturing building to be erected for the New Process Rawhide Co., Syracuse, N. Y. The structure will be four-stories and basement, 186 x 66 feet, and will cost $65,000.

The General Electric Co. has awarded the Henry Shenk Co., Pittsburgh, the contract for the construction of a building, 365 x 400 feet, at the new Erie, Pa., works, which will be of reinforced concrete.

Plans are being drawn for the construction of a reinforced concrete stadium to be built on Stoll field, Lexington, Ky., for the University of Kentucky. The proposed structure will cost $75,000.

The United American Insurance Co., Frankfort, Ky., will be ready to receive bids on its seven-story reinforced concrete office building in the near future. The cost of the building will be $100,000.

The Standard Sheet Metal Mfg. Co. has purchased the Zahniser foundry property of about two and a half acres, at Washington, Pa., and

will erect a new plant. The buildings are to be of steel, concrete and brick.

A brick factory building will be constructed at 249-255 South street, Newark, N. J., by the Aetna Realty Co., 738 Broad street.

The Columbia Steel Shafting Co., Pittsburgh, has plans prepared for enlarging the Rankin plant of this company, which probably will double the capacity of the works. Additional buildings with cranes and other equipment will be required.

R. Brinley Snowden, Memphis, Tenn., has plans for the construction of a 10-story reinforced concrete hotel building, which, he states, will cost $1,000,000. It will be of reinforced concrete construction. Specifications are now being prepared.

Plans for extensive improvements in the plant of the Gas & Heating Co., Nashville, Tenn., are being made. The company has increased its capitalization from $100,000 to $3,100,000, and will spend about $750,000 in improving its plant.

The Pittsburgh Sheet & Tin Plate Co., Morgantown, W. Va., has authorized the Schlieper-Daae Co., Pittsburgh engineers, to make plans and designs for a 10-mill sheet plant. George C. Sturgiss, Morgantown, is one of the active promoters of the new property.

The Olean Electric Light & Power Co. has purchased a site for a power plant on Irwin street, Olean, N. Y. Plans are being prepared for a structure estimated to cost $50,000, and about $200,000 will be spent for equipment. W. R. Page, Olean, N. Y., is president.

Plans soon will be announced for two large factory buildings to be constructed for the General Electric Co., at East Boston, Mass. The company has purchased a plot containing 175,000 square feet and will transfer the lamp department of the Lynn plant to East Boston.

Sundel Hayman, 2069 Fifth avenue, New York, will erect a light manufacturing building at 68-72 West 131st street. The building will be seven stories high and 52 x 90 feet. Elevator and power machinery will be required. Somerfeld & Stickler, 31 Union Square, prepared the plans, which will cost about $55,000 to execute.

Weingarten Bros. have taken out permits for two factory buildings to be erected in Newark, N. J. One of the buildings will occupy the present site of the company's plant at 401-405 High street, and will cost $16,000. The other will be erected at 158 Summit street, and will cost $40,000. Additional power and special machinery will be required.

The Champion Rivet Co., Cleveland, which recently purchased 20 acres in East Chicago, Ill., will soon begin the construction of a plant, the cost of which will be more than $1,000,000. Wilson B. Chisholm is president of the company; David J. Champion, vice president; Henry Chisholm, secretary and treasurer, and Matthew Champion, general manager.

The Milwaukee Corrugating Co., Milwaukee, Wis., is ready to commence work on the construction of a manufacturing plant at the foot of Burnham street. Plans have been prepared by Herman J. Esser, architect, Camp building, Milwaukee, for a steel and concrete structure, 210 x 610 feet, and an administration building, 40 x 60 feet. The cost will exceed $75,000.

The Cleveland Bronze & Brass Co., 4066 Hamilton avenue, Cleveland, will erect a new building, four stories and basement, 120 x 45 feet, and will be in the market for additional equipment in the near future. The new building will enable the company to increase its output to a considerable extent. The Walter L. Thompson's Sons Co., Cleveland, was awarded the contract for the building, which will be of concrete and steel.

The H. J. Frank Foundry Co., Davenport, Ia., is erecting a new foundry at a cost of $12,500, to be 80 x 150 feet, part of which will be used as a machine shop. All of the necessary equipment has been purchased and the company expects to pour its first heat about the middle of June or the first of July. This shop will engage in the manufacture of light gray iron castings, sash weights, grate bars, stove and furnace repairs, etc.

Power Plant Equipment

New motors, triplex pumps, centrifugal pumps and other electrical supplies will shortly be purchased for the Northern Illinois hospital for the insane, at Elgin, Ill. Bids will be opened by the state board of administration, Capitol building, Springfield, Ill.

The Oakfield Light & Power Co., organized recently at Oakfield, Wis., is preparing the construction of an electric lighting and power plant to cost approximately $10,000. A battery plant will be installed and will be ready Sept. 1. F. J. Carpenter is president and W. E. Bristol secretary.

Water Works

The Eberman waterworks, Morgantown, Ky., is considering the installation of machinery and the production of electric current in connection with its water plant.

The city of Ashton, Ill., will open bids May 23 for pumping machinery for its new waterworks. Details may be obtained from H. C. Nelson, village clerk.

The board of public works of Madisonville, Ky., soon will let a contract for the erection of a water plant, to cost $25,000. George A. Finley, W. J. Dulin and J. F. Dempsey are members of the board.

G. C. Morgan & Co., engineers, 111 West Monroe street, Chicago, have completed plans for the improvement of a waterworks system at Manitowoc, Wis., and estimate the cost at $26,700.

Miscellaneous

The Model Typewriter Co. is being organized at Morgantown, W. Va., and is having plans drawn for a plant for the manufacture of typewriters. G. E. Bruder is in charge of the company at the present time.

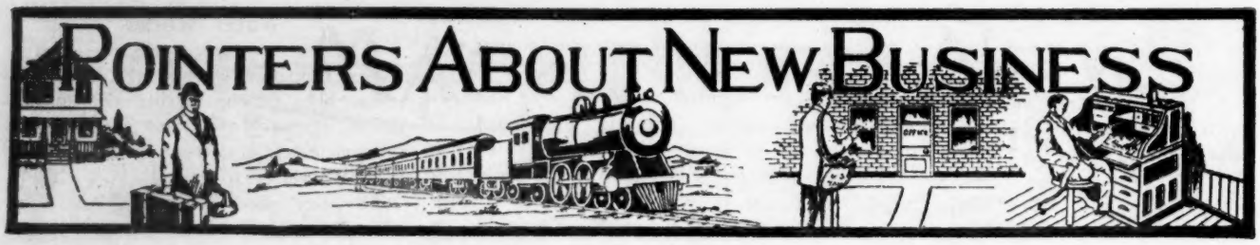
The board of control of charitable institutions, Frankfort, Ky., plans the installation of a 500-horsepower boiler at the western hospital for the insane at Hopkinsville, Ky. It will be equipped with underfeed stokers.

The Eastern Kentucky Land Co., Mt. Sterling, Ky., is planning the developing of coal and sandstone property near Cumberland Gap, Tenn., and is in the market for power and special machinery. Lewis Apperson is general manager.

The Phipps power plant, one of the largest private plants in Pittsburgh, has been sold to the Duquesne Light Co., Pittsburgh, as a central power station for the business district. The new owners are expected to enlarge this plant in the near future.

The National Steel Car Co., Pittsburgh, is applying for a charter at Harrisburg to manufacture iron and steel and other material for railway cars, equipment and appliances. The incorporators mentioned are W. J. Brown, Henry Fehring and D. L. McConaughey.

Frank P. James and James R. Curry, Lexington, Ky., and John E. Golden, Barbourville, Ky., have organized the Knox County Coal Co., capitalized at $250,000. It will develop coal lands in eastern Kentucky. Electrically operated mining equipment will be purchased. Operations will begin at once.



New Buyers

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

Quinsigamond Pressed Steel Co., Worcester, Mass.; $25,000; by Henry F. Larava, William A. Dean, Gertrude A. Quinn.

Carborite Steel Bit Co., Springfield, Ill.; $5,000; by Geo. A. Miller, M. L. Goodrich and Albert H. Roesler.

The Disco Auto Starter Co., Toledo, O.; $10,000; automobiles and automobile parts; by H. A. Cavanagh, R. S. Holbrook, L. R. Roper, B. H. Whitney, C. R. Banker.

The Capital Wire Cable & Mfg. Co., Ltd., Ottawa, Can.; capital, $40,000; provisional directors, John R. Buchanan, Joseph W. Perazzo and Robt. G. Code.

The Eureka Electric Co., Cleveland; $15,000; to manufacture electrical machinery, appliances and equipment; by A. S. Dole, H. H. Coyne, Samuel Lazarus, William Rothenburg, William R. Miller.

The Bergdoll Car Co. of Missouri, Camden, N. J.; $10,000; to build, construct, operate, to prepare for market motor vehicles, etc.; by Frank R. Hansell, John A. MacPeak, C. U. Martin.

The C. M. Thompson Mfg. Co., Newark, O.; $35,000; to manufacture hose clamps, pressed steel articles, metal stamping, galvanizing and railroad supplies; by Channing M. Thompson, Eugene F. Ball, R. Jones, M. Judd Reese and A. L. Norton.

General Industrial

The United Engineering Works, Alameda, Cal., has been awarded the contract for installing oil-firing machinery in the state tugs and San Francisco Ferry building, at a cost of $10,205.

The National-Hydro-Carbon Co., Pittsburgh, has purchased the plant of the American China Plate Co., at Toronto, O., and will install machinery and equipment. Several hundred men will be employed. The company will manufacture rubber novelties, roofing material and paints, and the plant will be in operation as soon as machinery can be installed.

The Bucyrus Co., South Milwaukee, Wis., as been awarded the contracts for a 66-ton electric shovel for the Lahontan dam work in the Truckee - Carson, Nevada, irrigation project. The contract price was $12,-050, f. o. b. Milwaukee.

The Jansen-Peterson Co., Cleveland, has been incorporated with capital stock of $100,000 to manufacture wood-working machinery and belt-sanding machinery. W. C. Bruce, president of the Bowler Foundry Co., Cleveland, and J. H. Bruce, secretary and treasurer of the foundry company, are members of the new concern, which has its headquarters on Columbus road.

The Duluth Diamond Drilling Co. advises that the machine shop and warehouse it is building at Duluth, Minn., is a small building to be devoted to storing diamond drills and parts at one end, while the other is to be used for repair work only. The company does not contemplate manufacturing any materials used in diamond drilling. The machine shop will be equipped with less than a half dozen machine tools adapted for use in repairing the company's own equipment.

The Gardner General Foundry Co., Gardner, Mass., is building three additions to its foundry. The main building is being extended a distance of 80 feet and will contain a modernly-equipped core shop and a well-lighted office. The second addition will be built on the north side of the existing foundry, which will increase the molding floor area 100 x 22 feet. This department will be equipped with molding machines throughout. The third addition consists of an extension to the rear of the main foundry building, 80 feet long and 40 feet wide. This will be used for the shipping and inspection department, as well as for storage purposes. This is the third extension to this plant in 10 years and the large number of orders the company has recently had on hand has compelled the employment of a night shift. When the additions are completed no operations will be carried on at night. This foundry specializes in small and medium sized castings weighing from one ounce to 2,000 pounds.

The Oneida Foundry Co. is erecting a new plant at Oneida, N. Y., the main building of which will be 156 x 52 feet. The cupola house will be located in a small structure outside of the main building, the spouts alone extending into the main foundry building. The cupola structure will be 18 x 24 feet, will be fireproof throughout and will be equipped with steel sash and a concrete roof. An electric power plant has been installed and the company will generate electric current for lighting and power purposes. Two cupolas will be installed, respectively, 56 and 66 inches in diameter, as well as an hydraulic elevator for delivering material to the charging floor. The molding machine equipment will consist of one gravity machine, two jar-rammers and one squeezer. Two tumbling barrels and one cinder mill also will be purchased. A pattern shop will be operated as well as a small machine shop. A coke and sand storage building, 26 x 80 feet, is to be erected. This company will engage in the manufacture of gray iron castings exclusively.

Trade Notes

The Bucyrus Co., South Milwaukee, Wis., announces the opening of an office at 1250 Brown-Marx building, Birmingham, Ala., under the management of E. L. Byron, who will have general charge in the southern states of the sale of steam shovels, dredges, drag line excavators and other manufactures of the company.

The Gulick-Henderson Co., inspecting engineers, chemists, etc., with general offices and laboratories in Pittsburgh, advises that, owing to continued growth of its business, it has removed to more suitable quarters and has located its general offices, laboratories, and test rooms in Pittsburgh at 525-529 Third avenue, corner Rose street. The company also announces that its San Francisco address is 444 Market street.